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THE GEOLOGICAL AND GEOGRAPHICAL RELATIONS OF THE LAND-BIRD FAUNA OF NORTHEASTERN AMERICA.

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THE antiquity of existing faunas is a problem beset with difficulties and involved in obscurity. One who fares forth in this quest will find few landmarks to serve him as a guide. No evidence from fossil remains is forthcoming, for the deposits in which recent animals have been buried are as yet incoherent muds and silt, often beneath the waters of lakes and swamps and tidal inlets. The remains of mammals and reptiles may thus have been accumulating in many places over long periods of time, since the beginning, at least, of post-glacial conditions. Undoubtedly the soils of old forest floors and peat bogs and the mud of lake bottoms contain a vast number of such remains, but it is altogether unlikely that among these is any large proportion of the more fragile skeletons of birds. Even if they were preserved these remains, like those of other creatures, would still be in inaccessible situations. The clew to this history of faunas is to be looked for rather in the distribution of living forms as we find them to-day; to facts relating to the alteration of habitats, the invasion of new territory by certain species, the recession from territory once occupied, and the dominance and variety of forms of particular genera in various localities.

¹ Read before the Delaware Valley Ornithological Club, Philadelphia, March 4, 1909.

The present paper is the outcome of an article previously published by the writer in 'The Popular Science Monthly'¹ which dealt with the effect of the settlement of the country upon the distribution of bird life, what we might term the bird life under aboriginal conditions as compared with its present aspects. The problem as stated in that article was this: If eastern North America was in the main a forest-covered land, as both historical narrative and existing physical conditions indicate, what was the status of the bird life that now inhabits our open fields and grass country? Have certain birds altered their *habits* or their *habitats*? Facts seem to point to the last named of the two alternatives as offering the mostly likely solution to the problem since most of our grass-frequenting species are of wide distribution toward the west, throughout the prairie region, and many of them are represented by geographical races on the Great Plains. Such species as the Vesper Sparrow or Grass Finch, the Savannah and Grasshopper Sparrows, the Meadowlark, Bobolink, and Red-winged Blackbird, the Killdeer and Grass Plover were cited in illustration, and I stated my belief that these birds had found their way into the newly opened lands from the western prairie region. An exception might be made in certain species — that of the Bobolink which may have frequented the river marshes, and also in the case of the Savannah Sparrow which appears to be a coastwise bird, dwelling along the edge of the maritime marshes, though its present habitat may be a comparatively recent occupancy. The Black-throated Bunting or Dickcissel was cited as a remarkable case of recession from its one time habitat in certain eastern localities during the latter half of the nineteenth century, and there is good evidence for believing that this bird was originally an invader from the prairie region. Its great abundance in the grass country of the Middle West and its rather limited distribution in the East, coupled with its somewhat abrupt disappearance from the last named region, certainly point to this conclusion. Audubon speaks of its abundance in the prairie lands of Texas, Missouri and Illinois as compared with the middle Atlantic districts and that it was "rarer in Ohio, and scarce in Kentucky," which¹ is good evidence, for at the

¹ 'Birds of the Grasslands.' The Popular Science Monthly, Vol. XLII. p. 453, February, 1893.

time of which he writes Ohio and Kentucky were still covered with much woodland. He further adds, "they are rarely observed to pass over South Carolina," a statement that would indicate that this species did not migrate along the coastal plain from the south, but spread eastward from its main prairie center of distribution.

So much for this aspect of the problem which is here briefly reviewed. There is abundant room for further research into the past and present relations of our eastern bird fauna, and it is the purpose of this paper to point out certain facts that seem to indicate changes in the status of the bird population of various districts. It is hazardous to attempt to draw conclusions as to the past history of a fauna from such slight evidence as the present distribution of species, but some irregularities in the distribution of certain species of birds seem to have been remotely the result of certain geological processes, at least within the post-glacial period. What evidence I have to offer in support of this statement is as follows: For a number of years I resided during the summer months (from mid-June to September) at Barrington, Nova Scotia. Barrington lies just back of Cape Sable Island at the extreme southern end of the peninsula. The general aspect of the surrounding region is that of a typical boreal country — a coniferous forest, composed mainly of spruces and balsam fir, interspersed with tamarack swamps, sphagnum moors with their associate flora, notably Labrador tea (*Ledum*), Rhodora, and several species of *Vaccinium*, thickets of the northern alder, and aspens and birches. The bird fauna is decidedly Canadian in its character, such forms as the Olive-backed and Hermit Thrushes, the Hudsonian Chickadee, the Golden-crowned Kinglet, the Red-bellied Nuthatch, the Nashville, Yellow Redpoll, Magnolia, and Myrtle Warblers, the Junco, the White-throated Sparrow, the Solitary Vireo, the Rusty Blackbird, the Canada Jay, the Alder and Olive sided Flycatchers, and the Black-billed Cuckoo being more or less abundant throughout the breeding season, while the Pine Grosbeak, the Pine Siskin, and both species of Crossbills were abundant during certain years in the breeding time, but conspicuously absent in other summers. With this assemblage of Canadian birds were many other widely spread species as the Robin, the Song Sparrow, the Black and White, Chestnut-sided, and Yellow Warblers, the Savannah

Sparrow, the Purple Finch, the Barn, Cliff, and Tree Swallows, the Nighthawk, Flicker, and others, but such wide-ranging forms as the Bluebird, the Vesper Sparrow, the Chipping Sparrow, the Goldfinch, and the Meadowlark were never observed during the six summers spent in this region, while the Kingbird only appeared at the latter end of the summer, about the last of August or early in September, though breeding in more or less abundance in districts farther to the north and west, and the Bobolink, which was quite common in the dike lands about Canning and the Basin of Minas, was only occasional in this southern Barrington district.

The past summer, 1908, I spent at Chester, Nova Scotia, a small village at the head of Mahone Bay, an inlet of the Atlantic, fifty miles south of Halifax and about one hundred and fifty miles north along the coast from Barrington. The region was in every way similar to that about Barrington, but here at Chester I found the Chipping Sparrow and the Goldfinch relatively abundant, yet at no time was either of these birds ever seen at Barrington, though habitat conditions there were equally favorable for both. How far southward these species extend beyond Chester I am unable to say, but the fact remains that they do not appear in the fauna of the lower part of the peninsula, at least so far as my six summers of observation and collecting about the Barrington region are concerned.

The solution of this rather curious local distribution of two such widely spread species as the Chipping Sparrow and the Goldfinch appears to me to be involved in a geological change, and to date back to a time when Nova Scotia was severed from the mainland, where what is now a low-lying and partly marshy tract of country which forms the present neck or isthmus that separates the waters of Northumberland Strait on the north from those of Chignecto Bay, at the head of the Bay of Fundy, on the south. This region, which we may call the Amherst district, from the principal town situated there, is evidently an uplift of comparatively recent geological date. Nova Scotia was unquestionably at one time an island, severed from the rest of the continent by a strait, probably of some width, which connected the two bodies of water mentioned above. How wide a stretch of water this strait may have embraced it is difficult to say. Prince Edward Island is now separated from the

mainland by Northumberland Strait of a varying width of from nine to thirty miles. There is evidence of considerable submergence in the region about Amherst as Sir J. W. Dawson has shown in his 'Acadian Geology' (4th ed., 1891, pp. 29-31). Submerged forests, mainly of pine and beech, have been found in several localities about Cumberland Basin and Cobequid Bay, and the great 'dikes' about the Basin of Minas, which are reclaimed maritime marshes, Dawson regards as undergoing slow submergence. All these facts indicate at least, an unstable condition, and taken together with the low relief of the region as a whole and the present general relations of land and water we are justified, I think, in believing that this strait once existed, and that at a not very remote period. Furthermore, there is much evidence to show that considerable areas along the northeastern coast of the continent have suffered submergence under the enormous weight of the ice mass that was pushed seaward from the Laurentide Glacier.

The relative distribution of land and water areas unquestionably exerts an important influence in determining the range of various species of land birds. Many land birds migrate over wide stretches of sea, but, as Wallace has pointed out, such routes possibly indicate a former land surface that has become gradually submerged. The observations of Mr. Wells W. Cooke would seem to disprove this, as the evidence he has gathered regarding the Gulf and Caribbean routes indicate that migrating birds frequently follow courses that lead over the deeper parts of these waters. In the problem before us, however, we are dealing with more than the purely migratory impulse. This migratory impulse *per se*, I take it, is the primitive instinct of certain species of birds to reach a northerly region where food of a suitable kind for the young is abundant and where the summer day is long, giving the maximum light conditions under which to forage.¹ After a bird has reached this summer home it will constantly tend to widen its breeding area, spreading out over a larger territory, limited of course by various ecological factors, as suitable habitat conditions, by the pressure of other species, by the nature and abundance of food, by temperature, and by the conformation of land and water areas. The entire

¹ See article by E. A. Schäfer, F. R. S., 'On the Incidence of Daylight as a Determining Factor in Bird Migration.' *Nature*, Dec. 19, 1907.

phenomenon of migration may possibly have originated as an extension of a once more southerly breeding range of various species of birds which followed the widening zone of green and the development of insect life northward in the wake of the receding ice sheets. The individuals of a species that spread farthest to the north became the migrating element, passing over the intervening areas.

The present land bird fauna of Nova Scotia may have been derived from two faunal stocks — a more primitive boreal one that has occupied the region from remote times, and a later transition fauna which has invaded the peninsula since the reëlevation of the previously sunken isthmus. This somewhat venturesome statement appears to be borne out by certain facts. Many of the boreal types belong to genera of widespread distribution in both the Nearctic and Palearctic regions. Such for example are *Pinicola*, *Carpodacus*, *Loxia*, *Spinus*, *Sitta*, *Regulus*, *Certhia*, and *Parus*. These may have occupied the region even during glacial conditions, for glaciers do not preclude a forest growth and food would be abundant during the short breeding season. Furthermore, these forms probably spread around the subarctic zone in Pleistocene times when possibly, as many geologists believe, a more extensive land relation existed between the eastern and western continental land masses than at present. Indeed, these genera may have a still older history, dating back to the Middle Tertiary, with a more decidedly polar distribution, but this is purely speculative and we have no evidence, fossil or otherwise, in support of this view. These boreal types, as we know, are wide rangers and the glacial winters would find them foraging to the southward, along the borders of the crowded Austral life zone. Narrow straits would offer no barrier; more than likely there was a much greater land area and wider land connections than at present when these hardy species made their seasonal shifts through the then subarctic forests of the region now embraced by Lower Canada and the northeastern United States. The present irregular movements of these birds may possibly be the result of a habit of wandering widely in search of food, impressed upon them by the precarious conditions of existence during the Glacial Period.

The purely American element in the present boreal fauna, such as the Thrushes, the several species of Wood Warblers, the Junco,

White-throated Sparrow, the Flycatchers and others mentioned above, seem to me to form a group that established themselves as breeders in the boreal zone at an early day after the uncovering of the land by the retreating glaciers, spreading into the Nova Scotia peninsula most likely soon after or possibly during the reëlevation of the land bridge. In reality they do not belong to the ancient boreal fauna as just outlined, but represent an early advance movement of the more southern bird life, a movement that is still in progress. These birds are all typical long distance migrants rather than wanderers and, unlike the true boreal wanderers, they leave a wide hiatus of unoccupied territory between their breeding grounds and their winter quarters. This is especially true of the Thrushes, Wood Warblers, the Vireo, and Flycatchers which feed on fruits, winged insects, and soft larva, while the seed-eating species like the Junco, the White-throated and other Sparrows, are not compelled to move so far and hence occupy a winter zone of territory much nearer to their breeding haunts. Yet even such northerly breeders as the Fox Sparrow and the White-crowned Sparrow leave a considerable breadth of unoccupied territory between their summer and winter ranges.

Sometime during the post-glacial period many purely transition or Alleghanian species spread into the Nova Scotia region, probably by way of the land connection, but the significant fact is that this movement is still going on and that some species, like the Chipping Sparrow and possibly the Goldfinch, have not yet invaded the entire territory. That they have come by the Amherst neck of land from the main continent is also evident since these birds do not appear to have reached as yet the more southern districts of the peninsula, at least along the eastern side, so far as my observations go. Still more significant is the support given to this view by Downs in his 'Catalogue of the Birds of Nova Scotia'¹ in remarking upon certain species. From what I gather his observations are chiefly in the neighborhood of Halifax and in the more western parts of the Province. Of the Chipping Sparrow he says: "Lately became rather common"; of the Field Sparrow, "not very com-

¹ 'A Catalogue of the Birds of Nova Scotia,' by A. Downs. Proceedings and Transactions of the Nova Scotia Institute of Natural Science, Vol. VII, pp. 142-178, 1888.

mon"; of the Rose-breasted Grosbeak, "not common about Halifax, but of more frequent occurrence in the vicinity of Truro and Pictou" (Truro and Pictou are toward the west and nearer the Amherst district). The Goldfinch Downs speaks of as common. Of the Red-winged Blackbird he says: "very rare . . . A few occur in the western part of the Province," and of the Meadowlark, "Very rare. Only a mere straggler." These are significant statements regarding two such widespread birds, especially the reference to the Red-wing occurring in the western part. The Vesper Sparrow he speaks of as a "common summer resident" though I never saw it about Barrington and Chester, nor did I see either the Field Sparrow or the Rose-breasted Grosbeak. Of the Catbird, which I found sparingly the first summer (1901) about the villages at Barrington, Downs says: "Rather common. . . . It does not arrive until the summer is well advanced. Breeds in alder swamps." This lateness of arrival, together with its apparently irregular appearance, may indicate a tardiness in the general northeastern extension of this species' range. The House Wren and the Thrasher are not included in Downs's list, nor have I ever observed these birds in the Province. The Ruby-crowned Kinglet is spoken of as uncommon, and this enlightening observation is made in regard to the Bluebird: "Uncommon. I have seen it breeding in an apple tree at Kentville. It appears to be getting a footing in Nova Scotia." I may add that I have never met with the Bluebird in the Province though I found it much farther north — on the north shore of the St. Lawrence near Les Eboullements in the Province of Quebec, and Dr. Dwight has recently reported it from Tadousac in the same region.¹

Further confirmatory evidence in regard to the extension of the range of certain birds is given by Dr. Dwight in his 'Summer Birds of Prince Edward Island'² where he speaks of the Chipping Sparrow as "Not a common species, and only occasionally observed." Of the Goldfinch he notes, "a few seen almost daily." Of the Vesper Sparrow Dr. Dwight says: "An abundant bird, frequenting the open fields in the more settled districts." Neither the Catbird nor the Bluebird are recorded by Dr. Dwight in this

¹ Auk, Vol. XXVI, Jan., 1909, p. 83.

² *Ibid.*, Vol. X, Jan., 1893, p. 1.

Prince Edward Island list, and it is quite possible that these birds have not yet found their way across Northumberland Strait, while they certainly have invaded the Nova Scotia peninsula, though sparingly, by way of the isthmus. The Red-winged Blackbird and the Meadowlark likewise are not included in Dr. Dwight's list, though recorded by Downs in Nova Scotia as above mentioned.

These facts, it seems to me, point pretty conclusively to the gradual extension of certain species of birds into an area formerly separated from the main mass of the continent. Nova Scotia offers a singular proof of the use of a land route, for it would seem that birds had found their way into the region by the Amherst isthmus, as evinced by the occurrence of a number of species in localities comparatively near to this district, while still absent, or only occasional, in the more southern and eastern parts of the Province. Most of these species, also, as recorded by Downs, are still comparatively uncommon. In a list of birds observed at Pictou, N. S., from January to July, 1895, by W. A. Hickman,¹ the Chipping Sparrow, Field Sparrow, and Goldfinch are mentioned as very common breeders, but the Catbird, the Bluebird, and the Red-winged Blackbird and Meadowlark are not included in these observations.

Taking a broad view of the problem it would seem that there is some evidence for entertaining the idea that the extension of species into more northerly breeding grounds is a phase of distribution that is still going on; that our so-called "faunas" — Carolinian, Alleghanian, and Canadian — in reality represent a somewhat temporary state of groups of species in relation to breeding areas, and the more or less arbitrary boundaries of these faunas represent our knowledge only of the present conditions of distribution in a gradual and general northward movement of considerable antiquity. Mr. Witmer Stone has furnished me with some interesting facts relating to the northward extension of certain Carolinian birds into the Alleghanian, and even into the Canadian, zones of Pennsylvania.² About Harvey's Lake, Luzerne Co., and at Lopez, Sullivan Co., since the cutting off of the hemlock timber over considerable areas, the Yellow-breasted

¹ See *Ottawa Naturalist*, Vol. IX, p. 230.

² Stone, 'Birds of Eastern Pennsylvania and New Jersey.'

Chat, a bird regarded as characteristic of the Carolinian fauna, has made its appearance as a breeder, while the Chewink, a species of decidedly austral range, rarely going beyond the transition zone, has likewise invaded these localities. Mr. Richard C. Harlow,¹ records the Tufted Titmouse and the Yellow-breasted Chat in the decidedly Canadian element of Pike Co., Pennsylvania. Undoubtedly the conditions incident to 'second growth' are largely a determining factor in this invasion of new territory, for the opening up of a tract of country to more sunlight would certainly bring about an environment not unlike the typical Carolinian region further south. Still the individuals of these species must have the tendency to move northward farther than their apparent faunal limit, otherwise they would not find these favorable spots in new territory. Most likely they invade the region by way of the river valleys, spreading out into the surrounding districts.

Dr. Merriam has accumulated a vast amount of evidence to show the control exerted by temperature in the distribution of living organisms.² But is not this temperature relation more apparent than real, a temporary adjustment to the environing conditions which the temperature brings about rather than a hard and fast relation between temperature and the organism direct? The whole question is recondite, but it seems hardly possible for such closely related species as, for example, the Wood Thrush, the Veery, and the Gray-cheeked Thrush to be so profoundly influenced by temperature alone as to have their northward breeding ranges so widely different. Rather it seems to me each form represents either a pioneer or a laggard movement, as the case may be, in a general tendency of various species of birds to spread gradually northward into a region of new environing conditions which has been opened to them since the Glacial Period. The Canadian fauna, barring the more or less circumpolar forms, thus represents an advance group of species that spread into northerly breeding grounds at a probably early day after the disappearance of glacial conditions; the Alleghanian fauna that of species that spread at a later date and are still spreading into new

¹ 'Summer Birds of Western Pike county, Pennsylvania.' Cassinia, 1906, pp. 16-25.

² 'Laws of Temperature Control of the Geographical Distribution of Terrestrial Animals and Plants.' National Geographic Magazine, Vol. VI, 1894, pp. 229-238.

territory, while the Carolinian birds are the laggards in this northward movement. Each group or fauna has become more or less adapted to certain characteristic conditions within the area in which they have established themselves as breeders. Some of the Carolinian species, as the Cardinal, the Carolina Wren, the Tufted Titmouse, and the Turkey Buzzard show but a slight tendency to recede from their breeding range during the winter, owing, no doubt, to the less northerly position which they have attained. Toward the northwest where a wide expanse of territory has been open since the Glacial Period many species of birds which breed widely throughout the Transition zone have spread as far north as the Great Slave Lake, reaching even to the edge of the Barren Grounds.¹

The problem as to the primitive centers of distribution from which our bird fauna was originally derived has been so ably set forth by Dr. J. A. Allen in his article on 'The Geographical Origin and Distribution of North American Birds, considered in Relation to Faunal Areas of North America',² that there is little left to say upon the subject. Students of ornithology and of geographical distribution in general owe Dr. Allen a lasting debt of gratitude for his comprehensive presentation of the facts and his illuminating deductions therefrom. It would appear from Dr. Allen's review that sometime during the Tertiary Period, possibly as early as the late Miocene, there was a spreading out toward the east of certain types of birds which find their center of development to-day in the Plateau Region of southwestern North America and Mexico. Such forms as the Chewink, the Thrasher, and the Bluebird are certainly of plateau origin and the same is probably true of the Bob-white and the Wild Turkey. A second and large element in our eastern bird fauna is of tropical origin, derived from Middle and South America. To quote Dr. Allen³: "Our Vultures, several genera of our Hawks and Owls, our Cuckoos, most of our Woodpeckers, our Nighthawks, Whippoorwills, Swifts, and all of our Hummingbirds; all of our Flycatchers, Orioles, and Blackbirds,

¹ See Preble, *North American Fauna*, No. 27. 'A Biological Investigation of the Athabasca-Mackenzie Region.' 1908.

² *The Auk*, Vol. X, p. 97. April, 1893.

³ Dr. Allen, in his paper, is speaking for the entire country, not the eastern part alone, to which the present article is confined.

and our Vireos and Tanagers; many of our Sparrows and Grosbeaks; all of our Gnatcatchers, and the Mockingbirds, some of our Wrens, and a few of our more southern genera of Warblers, as the Yellowthroats and Redstarts," are clearly of tropical origin. Probably this influx of plateau and tropical types into the eastern region was a very slow and gradual movement which took place during and after the addition of the marginal Tertiary seafloor to the southeastern portion of the continent, which increased the land area to the extent of the present southern and Atlantic coastal plain. Much of Cuba, the peninsula of Yucatan, and the eastern seaboard of Mexico was uplifted about this time. A third element appears to have had its origin within the limits of the region itself, though many of the genera are represented by numerous species in the western portion of the continent. Of the more strictly eastern genera may be mentioned *Dolichonyx*, *Mniotilta*, *Protonotaria*, *Helinaia*, *Helmitherus*, *Helminthophila* (the larger number of species), *Dendroica* (mainly eastern), *Siurus*, *Oporornis*, *Sylvania*, *Galeoscoptes*, *Cistothorus*, and *Telmatodytes*. The fourth element in our bird fauna is the Old World boreal group of genera already mentioned and a number of species of pronounced Old World affinities, as the Robin, the *Hylocichline* Thrushes, the Titlark, the Barn, Cliff, and Bank Swallows, the Shrikes, Crows, and Shore Larks, which have been more or less modified from Palæarctic types.

It is next to impossible to say in which portion of the continent many of the purely indigenous or autochthonous forms had their origin, for they are spread across the land from ocean to ocean in a succession of closely allied species or as local races. This is especially true of most of our genera of indigenous sparrows. Undoubtedly there occurred sometime during middle and late Tertiary times an extension of plateau types into the humid Eastern Province, and, conversely, a spread of eastern forms into the arid districts of the Plateau region, while at the same time an influx of tropical forms made their appearance, coming probably in the main from a tropical land area in the southwest and following the widening Gulf margin of the continent. How far north this preglacial bird fauna of diverse origin may have spread it is impossible to say, but some forms, even of tropical origin, undoubtedly

reached a high latitude, very probably during the warm Miocene and early Pliocene times, and their descendants may possibly now be represented by those migrants which breed far within the limits of the Boreal Zone. During Miocene times there were extensive land connections between Asia and Northwest America and very likely a much closer land relation between Europe and America. It was during this time, no doubt, that the influx of our Palæarctic types occurred, and it is a significant fact that all of these genera are of extensive range and of markedly northern distribution, such for example as the Passerine genera *Merula*, *Regulus*, *Parus*, *Sitta*, *Certhia*, *Anthus*, *Hirundo*, *Petrochelidon*, *Riparia*, *Ampelis*, *Lanius*, *Pinicola*, *Carpodacus*, *Loxia*, *Acanthis*, *Passerina*, *Calcarius*, *Corvus*, and *Otocoris*.

Throughout an immense lapse of time, time that must be reckoned in hundreds of thousands of years, during which the great Keewatin and Laurentide glaciers pushed their ice sheets beyond the present site of the Great Lakes and the Mohawk Valley, forcing southward the animal and plant life into an area of high biotic tension, a widespread change in types must have taken place. The more primitive forms have undoubtedly disappeared. Only occasionally may we pick up a trace of this ancestry in some fleeting juvenal phase of plumage. Modifications of type went on; differentiation into new genera, species, and varieties through molecular changes in pigmentation, in size and shape of bill and feet, of wings and tail, and in the deep-seated structure of the germ plasm. Diversity of structure went hand in hand with diversity of habit and of habitat. It was a period of profound environmental moulding, intensified by the effect of the glaciers on the land and its life. From our limited point of view the array of species and varieties which we see to-day seem peculiarly stable in their features and their adaptations. But the dynamic influences of environment are ceaseless if inconspicuous. Species and faunas alike are but passing phases in the vast cosmic processes of a continent's history.

THE USE OF THE WINGS AND FEET BY DIVING BIRDS.¹

BY CHARLES W. TOWNSEND, M. D.

BIRDS that dive and swim under water may be divided into two main classes,—those that habitually use the wings alone for sub-aqueous propulsion, and those that use the feet alone. The following paper includes my own observations which have been made only on wild birds and have been recorded at the time, and of records given me by other observers, as well as of those collected from literature. These two last named include observations on captive birds in tanks, which I believe are of value, for, as we shall see, the birds that habitually use their wings alone under water when in the wild state, and those that habitually use the feet alone, follow this rule even when confined.

In watching wild birds diving I have concluded that those that spread their wings just as they enter the water, use them under water, while those that keep the wings tightly pressed to the sides, and often execute graceful curves in diving, sometimes leaping clear of the water, depend on the feet alone. The truth of this conclusion I have confirmed in some instances by observing the bird under water; in other instances the conclusion has been borne out by the observation of others, so that the rule is, I think, a good one. Since formulating this rule I have found that Edmund Selous (15) expresses this same idea when he says: "This opening of the wings in the moment of diving is, I believe, a sure sign that they are used as fins or flippers under water." And again (16): "On the other hand cormorants, shags, and mergansers, birds which do not use their wings in this way, dive in a quite different manner. Instead of the sudden, little, splashy duck, as described, they make a smooth gliding leap forwards and upwards, rising a little from the water, with the neck stretched out, and wings pressed close to the sides to enter it again back foremost, like a curved arrow, thus describing the segment of a circle."

In the Loons and Grebes, the wings are small, but the legs are large and powerful. The femur is short and stout, thoroughly

¹ Read before the Nuttall Ornithological Club, February 15, 1909.

imbedded in muscular tissue, while the tibia is long and provided with a crest or keel on the anterior surface of the proximal end, to which the powerful muscles that move the tarsus and toes are attached. In the Grebes there is a very large patella. In these respects this group resembles the fossil *Hesperornis*, a toothed bird with wings represented by mere vestiges, but one that was strongly specialized for propulsion through the water by means of the feet alone.

The Loon and the Red-throated Loon in diving keep the wings closely pressed to the sides, and disappear below the surface without a splash, propelled apparently by the leg action alone. I have not been able to see these shy birds under water, but the inference that they do not use their wings there is confirmed by Mr. C. H. Townsend (25) who says in regard to a tame Loon observed in the New York Aquarium: "In exploring the bottom of the pool, or in pursuit of Killifishes it swam under water *with its wings closely folded* — never in use." The italics are his. The pool in which the Loon was confined was of ample size to display the agility of both bird and fish; it was twenty-eight feet long and three feet deep. Evans (3) states positively both of Loons and Grebes that "when submerged they do not use the pinions." C. Lloyd Morgan (27) says: "It must be remembered that Grebes and divers do not use the wings for progression under water." Lea (8) says of the Loon: "It uses its large webbed feet only, when swimming [under water]."

Although progression by the feet alone seems to be the rule in this group, yet it is a fact that at times the wings also are used. Thus Mr. C. Wm. Beebe, whose opportunities at the New York Zoölogical Park are unusually great, writes me under date of Nov. 6, 1908, that "Grebes and Loons do [use their wings] at times of emergency to turn quickly, or get up a burst of speed."

Mr. Wm. Brewster tells me, and the observation has been confirmed by others, that Loons in diving under boats to avoid being hemmed in, or in hurrying from their nests, use their wings as well as their feet, and this I think has given rise to the idea that they always use their wings. I have also been told by those who have observed young Loons, that they use both wings and feet in diving. A note of this sort was given me by Mr. F. H. Allen, who was impressed by the "quadropedal action" of the young bird under water.

I have watched Horned, Holboell's and Least Grebes diving, and as in the case of the Loons the wings are always kept closely pressed to the side. While the Grebes are able to sink mysteriously in the water, or to dive with very little motion of the body, they often leap clear of the water and execute graceful curves or arcs as they descend into the water. At such times the feet are stretched out behind. In the shallow water of a pond at close range I have seen the powerful leg strokes of the Least Grebe as it progressed under water, while the wings were seen to be motionless at the sides. On several occasions at Ipswich I have been treated to an excellent view of Horned Grebes as they dove, borne up in the clear transparent water of an advancing wave before it broke on the beach. In this case the wings were not in use, they were pressed close to the sides, while the Grebes advanced rapidly by leg strokes alone.

Joseph Kittredge, Jr. (7) in describing the actions of a Horned Grebe in a small tidal pool says: "He dove immediately. . . . In this case certainly, he did not use his wings in swimming." Evans, as already quoted, states that Grebes do not use their wings under water, and in another place (4) he says: "in diving the feet alone act as oars." Mr. A. C. Bent in reply to a question on this subject kindly wrote me as follows: "While collecting in the big Grebe rookeries in Saskatchewan I had ample opportunities to observe the Western Grebes swimming under water at short range, often almost at my feet; I am quite sure that they generally swam with the wings closed, and swam very rapidly. I am quite sure that I have seen the Loons do the same thing, though I have no doubt that they both use their wings occasionally."

Very different is the case of the Alcidæ, the Auks, Puffins and Guillemots, birds with stout rounded bodies and short necks. In all the members of this family that I have seen, the wings of the diving birds are not pressed to the sides but spread out for action as they go below the surface, and I have actually seen the wings used under water in some instances. The Puffin on the Labrador coast allows of close approach, and one can plainly see the wings used vigorously as the bird descends under water. That the wings alone are used is stated by Selous (17) who says: "I have been able to follow the Puffin downwards in its dive, and at once noticed that the legs, instead of being used, were trailed behind, as in flight,

so that the bird's motion was a genuine flight through water, unassisted by the webbed feet."

The Black Guillemot or Sea Pigeon plainly uses its wings under water, for it goes down with a very obvious flop, spreading both wings as if to push the water away. Selous (22) says: "In swimming under water the Black Guillemot uses its wings only — the rose red legs trail behind it, a fading fire as it goes down." Mr. James L. Peters writes me that he "watched a Black Guillemot off Nahant. We were almost directly above him and, while we could see his wings nicely, his feet were quite hidden. When he dove he spread his wings and used them under water."

The Razor-billed Auk and the Murres spread their wings in diving, but I have not seen these birds under water. Selous (24) says of these birds: "Whilst watching the Guillemots [Common Murres] on the ledges, one of them flew down into the sea, just below, which was like a great, clear basin, and thus gave me the first opportunity I have yet had of seeing a Guillemot under water. It progressed, like the Razorbill and Puffin, by repeated strokes of its wings, which were not, however, outspread as in flight, but held as they are when closed, parallel, that is to say, roughly speaking, with the sides, from which they were moved outwards, and then back, with a flap-like motion, as though attached to them all along. Thus the flight through the water is managed in a very different way from the flight through the air." In another place (20) he says: "Razorbills also dive briskly, opening the wings.... One remarks then that the wings are moved both together — flapped or beaten — so that the bird really flies through the water. In flight, however, they are spread straight out without a bend in them, whereas here they are all the while flexed at the joint, wing raised from and brought downwards again towards the sides in the same position in which they repose against them when closed."

Of the Dovekie or Little Auk I have had the opportunity to make some interesting observations. In diving the wings are spread out as in others of the group, and, from a near-by rock, I have plainly seen it using its wings as it swam under water. As to the feet I cannot say, for I have no note nor distinct remembrance as regards these members. One is apt to assume that the feet as well as the wings are used in these birds under water, but the careful

observations of Selous on other members of the group show that the wings only are used.

The Great Auk, with wings reduced to flipper-like proportions, doubtless advanced rapidly through the water by the action of these members only.

The Penguins, although entirely distinct from the Auks, fly through the water with their attenuated flipper-like wings, and, according to Beebe (1) who has watched them in tanks, "make but little use of their feet in swimming, only occasionally aiding the tail in steering." Evans (5) says: "When submerged, the wings act as paddles with alternating rotary action, and the feet as rudders, but on the return to the surface the latter naturally become propellers." Lea (9) says of Penguins: "Their flight may be watched and studied in the large glass tanks at the 'Zoo'. . . . With short, rapid strokes of its paddle-wings it darts through the water leaving a trail of glistening bubbles behind, and shoots forward with the speed of a fish, turning more rapidly than almost any bird of the air by the strokes of the wings alone, the legs floating apparently inert in a line with the gleaming body, or giving an occasional upward kick to force it to greater depths."

Some of the Terns, in plunging for fish, disappear entirely under water, and as their feet are comparatively feeble, and as their wings are partially open in the plunge, it is possible that these latter are used to some extent in aiding their progress, although it is probable that the impulse of the plunge alone is all that is necessary.

Among the Tubinares, some of the Petrels and the Shearwaters plunge under water. Darwin (2) says of a diving Petrel, *Pelecanoides berardi*: "When disturbed it dives to a distance, and on coming to the surface, with the same movement takes flight. After flying by the rapid movements of its short wings for a space in a straight line, it drops, as if struck dead, and dives again. . . . It would undoubtedly be mistaken for an auk, when seen from a distance, either on the wing, or when diving and quietly swimming about the retired channels of Tierra del Fuego." Lea (10) states of the Capped Petrel, *Æstrelata hæsitata*, now nearly extinct: "It poises itself in the air for a moment at a height of twenty or twenty-five feet, and then, folding its wings, takes a header into the water. The actual plunge is made with the wings open, and

they are used under water much in the same manner as during flight."

The plunge of the Gannet, with wings partly open, is so swift and often from so great a height, that it seems probable that there is no need of either wings or feet under water, but that the initial impulse of the plunge, which must be greater than that of gravity alone, is sufficient to enable the bird to catch its prey.

Cormorants execute graceful curves in diving with wings close pressed to the sides, often throwing themselves clear of the water with their powerful feet. I have never seen them under water but have conclusive evidence from literature on this point. F. W. Headley (6) says: "The Cormorant uses his feet alone to propel him [in diving] striking with both simultaneously, and holding his wings motionless, though slightly lifted from the body. The position of the wings must have given rise to the idea, common among fishermen, that the Cormorant flies under water. . . . But when you see him in a tank you can have no doubt that the legs are the propellers." Mr. Beebe, in a letter, confirms this observation from his experience with Cormorants in tanks. Selous (23), speaking of Shags, both adults and full grown young, observed in caverns in the Shetland Islands says: "Others, whose young were still with them on the nest, although full-fledged and almost as big as themselves, plunged, attended by these into the water. . . . It was easy to follow these birds as they swam midway between the surface of the water and the white pebbled floor of the cavern, and I was thus able to confirm my previous conviction that the feet alone are used by them in swimming, without any help from the wings, which are kept all the while closed. I have many times observed this before, but never so clearly or for such a length of time." Lea (11) says of Shags: "This species also may be watched at the 'Zoo'. It always begins its dive by jumping up in the water and taking a header, and then strikes hard upwards with both feet. You will see that it does not use its wings at all for swimming, but holds them quite still, lifted just a little away from its body. It strikes out with both feet simultaneously, and in this differs from the Darters (*Plotus*), which adopt an alternate stroke, as you may see for yourself by visiting the Diving-birds' House at feeding-time." In this connection it is interesting to note that Cormorants

in rising into the air in flight kick away the beach or the water with both feet together. This I have proved by examining the imprints of their feet in the sand of a beach.

The Darters or Anhingas, as just referred to by Lea, use the feet alone under water.

Among the Ducks, both classes of divers are found. The American and the Red-breasted Merganser both dive like the Cormorant. They often leap clear of the water, in graceful curves, with their wings cleaving closely to the sides. At other times the leap is much curtailed, or they sink beneath the surface without apparent effort. I should infer, therefore, that the wings were not used under water, and this inference is borne out by the following from Selous (16): "The merganser dives like the shag or cormorant — though the curved leap is a little less vigorous — and swims, like them, without using the wings. His food being fish, . . . he usually swims horizontally, sometimes only just beneath the surface, and, as he comes right into the shallow inlets, when the water almost laps the shore, he can often be watched thus gliding in rapid pursuit."

The other members of this order that do not, I believe, use the wings under water are the Redhead, Greater and Lesser and Ring-necked Scaups, Whistler and Bufflehead, while those that do use the wings are the Old Squaw, Harlequin Duck, the three Eiders the three Scoters and possibly the Ruddy Duck. This list I have made out from my own observations of the way the wings are held in these birds as they dive, and in a few cases the birds have been observed under water. The only member of our eastern sea or diving ducks omitted from the list is the Canvasback, which I have never seen dive. It is probable that it acts as does the nearly related Redhead. It is interesting to notice that the two classes are grouped separately in the A. O. U. Check-List, the first class being placed together at the beginning of the list, the other class at the end of the list.

Some of these Ducks feed largely on the bottom on shellfish and crustaceans, or on vegetable matter, while a few of them feed largely on fish. The latter birds would naturally develop the swiftest form of propulsion. Mergansers, Whistlers and Buffleheads, largely fish-eating Ducks, progress by the feet alone, while

Eiders and Scoters, almost entirely bottom feeders, use the wings. Many of the others, however, cannot be divided in this way.

Redheads in diving keep their wings close to their sides and Mr. Beebe writes that these birds, as observed by him in tanks, do not use the wings under water. The Scaups, both Greater and Lesser, in the same way keep the wings close to the sides in diving, and sometimes leap clear of the water or disappear with scarcely an effort. Mr. G. M. Allen tells me that he watched a captive Ring-neck Scaup in a small pool, and was able to observe not only the clean cut leap and dive with wings close to the side, but the rapid progress under water by the use of the feet alone. The Whistler or American Golden-eye, is also a graceful diver, and, as far as I have observed, always keeps its wings close to its sides in diving. As it disappears from sight it often sends up a little spurt of water by the powerful action of its feet. I should therefore conclude that the Whistler habitually swims under water by the use of its feet alone. Mr. Wm. Brewster, however, tells me that he has seen it make use of its wings in diving, but this was probably at times when the bird was hard pressed, and it acted as does the Loon in similar circumstances. The Bufflehead also keeps its wings close to its sides in diving, and sometimes leaps clear of the water before it disappears from sight.

Old Squaws, on the other hand, open their wings before diving as plainly as do the Guillemots and the Puffins. On one occasion, while I was watching some Old Squaws sporting in the water off Nahant, chasing each other on and just below the surface, I distinctly saw the wing of one of them cut the water from below like the fin of a great fish. A Harlequin Duck, that I saw on the Labrador Coast, opened its wings as it dove. I have watched the Northern Eider, the American Eider and the King Eider dive, and all open their wings for subaqueous flight as they go down. Of the Eider Selous (15) has made some satisfactory observations. He says: "Their dive is a sudden dip down, and in the act of it they open the wings, which they use under water, as can be plainly seen for a little way below the surface."

Our three Scoters, — American, White-winged and Surf Scoters — all open their wings as they dive. I once shot and slightly wounded a Surf Scoter that was standing on the edge of the beach

at Ipswich. He took to the shallow water and dove where I could plainly see him flying along under water using his wings.

My observations of the Ruddy Duck lead me to think that although its wings are often close to the sides at the beginning of the dive, they are opened just as the bird goes under the surface. The short but strong wing in this bird would suggest adaptation for subaqueous flight.

The curious Steamer Duck, *Tachyeres cinereus*, of the Straits of Magellan, that in the adult state at least is unable to fly, but flops along the water by the use of its wings, and dives awkwardly, probably uses its wings under water. Darwin (2) says that he is "nearly sure" that this bird uses the wings alternately.¹

The group of River Ducks obtain their food by dipping their heads and necks below the surface of the water, but occasionally these birds dive. I have observed close at hand semi-domesticated decoy Black Ducks sporting together, and diving awkwardly. In this case both wings and feet were used. As regards the Mallard, the following note kindly communicated to me by Mr. Wm. L. Finley in a letter dated January 4, 1909, is of considerable interest. "While in the lake region of southern Oregon, on two different occasions I saw a young Mallard duck swimming under water. He looked to me exactly like a frog. He was not many days old. He used his little wings as if they were two front feet, and he went through the water like a streak." It is evident from the context that the feet were used as well as the wings. Teal occasionally dive, especially when wounded, but I have no observations to record as to the method used.²

The Rail family show an interesting diversity in the manner of diving. The American Coot, *Fulica*, with its large lobed feet has evidently perfected the feet method, for with its feeble wings close to its sides, it often leaps out of the water and describes an arc, the bill entering the water as the feet leave it. At other times it disappears without any leap, and all degrees between these two extremes are to be found. Mr. Beebe writes me that Coots in

¹ The alternate action of the wings has already been referred to in the case of Penguins. I have for some years been almost convinced that Chimney Swifts use the wings alternately in flight.

² I recently watched a wounded Brant dive and swim under water. In this case the wings were flapped slowly and the feet used rapidly.

tanks use the feet and not the wings under water, and Selous (18) believes that the Coot belongs "to the cormorant-school of diving." This he infers from the manner of its entering the water. He apparently has not seen it under water.

I have no observations of my own to record on Rails proper and Gallinules but Selous (21) says of the English Moorhen, *Gallinula chloropus*, that he "may follow no fixed plan in his diving, for I have certainly seen him using his feet only under water, and I believe I have also seen him using his wings." Lea (12) says of the Moorhen: "After diving, it flies through the water at a great pace."

Among the Shore-birds the young of the Spotted Sandpiper are said to use both wings and feet in diving.

The impetus of the Kingfisher is probably all that is needed by this bird in its plunge, but it is possible that it occasionally scrambles a bit with its wings under water,—its feet can hardly be of use.

Among Passerine birds the water Ousel is the only diver, and it is well known that this bird uses its wings under water, and many observers state that it uses also its feet (13).

From the result of these studies it seems reasonable to conclude that diving birds tend to specialize in two directions,—either towards the use of the feet alone, or of the wings alone. The question naturally arises as to which line is superior, which has produced the swiftest diving bird,—the line that has lead to the use of the feet alone or that which has lead to the use of the wings alone? It is evident that a method of diving which leaves the wings unimpaired in size or form for the use in the air is a desirable one, and this is possible where the feet alone are used. In most fishes propulsion is from the rear by means of the tail, for the pectoral fins, which correspond to the birds' wings, are used chiefly for balancing. When the fish swims fast these fins are kept close to the sides. Among mammals the cetaceans have developed greatest speed in diving and swimming under water, and here also the tail is the propulsive power, while the anterior extremities are used chiefly for balancing. The modern screw propeller is superior to the old side-wheeler.

In *Hesperornis* the wing is a mere vestige, reduced to a slender humerus only, without even articulating facets on the distal end.

The tibia, however, is of great strength and size, provided with a keel or crest for the attachment of powerful muscles, and the patella is enormously developed. It is evident that *Hesperornis* pursued its prey under water by means of the feet alone, and that through many generations it had gradually lost the use of the wings, which must have been, therefore, a hindrance rather than a help in its subaqueous flight. It had long since given up aerial flight. Loons and Grebes, however, although apparently allied to *Hesperornis*, do at times, as we have seen, use their wings in addition to their feet under water, yet it seems to me probable from the evidence adduced that as a rule they progress by the feet alone. The young appear to use the wings as well as the feet habitually. These facts would seem to indicate that the method of posterior propulsion in Loons and Grebes has not been long developed nor permanently fixed, and that the young show the ancestral or primitive form of locomotion. The close resemblance in the legs of the Loons and Grebes on the one hand, and *Hesperornis* on the other would suggest either a case of parallelism from similar functions, or that they were all descended from the same stock. In the 'Birds of Essex County' (26) I spoke of the Loon as "approaching the wingless conditions." The present studies would, however, lead me to believe that the Loon in perfecting the method of posterior propulsion under water, has no need to reduce the size of its wings for use there. It can, however, with advantage increase their size, provided it does not use them under water, for the wings are now so small that on calm days it is unable to rise into the air.

Cormorants on the other hand have for so long a time perfected the posterior propulsion method that they do not use the wings under water even apparently when young. In consequence they have been able to retain large wings for aerial flight. That they can develop great speed under water and are very expert fish-catchers is well known.

The other line of evolution, the subaqueous flight by anterior propulsion, or by the use of the wings alone, reaches its height in the Penguins, and probably in the extinct Great Auk, two birds widely separated genetically, but converging to the same result in this particular. Both birds in developing speed under water by the use of the wings, reduced them in size to the proportions of seal's

flippers,— most markedly so in the case of the Penguins,— thereby showing that large wings are not only unnecessary, but even a hindrance in subaqueous flight. In attaining this end they were obliged to sacrifice aerial flight. This the Penguins were able to do owing to the absence of land mammals in their antarctic breeding grounds. The same conditions existed for the Great Auk at its chief breeding place in this country on Funk Island, until the arrival of that most destructive land mammal, the white man.

The Diving Petrel of the Straits of Magellan is a bird that appears to be in danger of sacrificing aerial for sub-aqueous flight, and illustrates the inconveniences of this line of evolution. Nichol (14) says of this bird, after describing its short flights in the air and its diving: "In appearance it reminds one forcibly of the little auk. . . . The wings are very small and weak, the bird, doubtless, is losing the power of flight."

In the case of the existing Alcidae and of the other birds that habitually use the wings alone in diving, it would be interesting to determine whether they are able to progress under water as fast as those birds that use the feet alone, for the Alcidae are trying to make the same tool work for two purposes, to propel them in the air as well as in the water. One is impressed with the imperfection of their wings for both purposes, when one watches a Puffin endeavoring to get out of the way of a steamer. First the bird dives and flies under water. Then in alarm it rises to the surface and attempts to ascend into the air on its wings, but unless there is a strong wind to act on its small aëroplanes, it soon gives up the attempt and flops down into the water again. Although it would be difficult to prove, it would seem to me reasonable to suppose that the compressed pointed body of the Loon, with the air expelled from beneath the flattened feathers, would make faster progress by feet action alone, than by the wings or by the wings and feet combined, unless the wings were reduced to the proportions of flippers. It is possible that the occasional use of the wings observed in these birds may be explained by fright, which causes them to "lose their heads," and return to the ancestral form of progression, to a reptilian scramble so to speak, without increasing the speed of their progress. It could also be argued that the wings of Loons are now so reduced in size that their use in emergencies

under water is a help and not a hindrance. Experiments on captive birds in tanks might determine these facts.

That Loons are able to progress faster under water than on the surface I have concluded from such observations as the following (26): "Thus on one occasion I was watching a Loon swimming about, dipping his head under water from time to time on the lookout for food. The cry of another Loon was heard at a distance and my friend immediately dove in the direction of the other, and, appearing on the surface for a moment, dove again and again until he reached his companion. At another time on the Maine Coast while watching a flock of young Red-breasted Mergansers swimming off the shore, I noticed a movement as of a large fish on the water outside. The Mergansers at once flapped in alarm along the surface of the water towards the shore where I was hidden, and I soon saw that a Loon was chasing them, following them under water." Theoretically a Loon should be able to go faster under water than on the surface, for on the surface the bird is retarded by the waves in front and the eddies behind, and the faster it goes the more it is retarded by these factors. The subject of the resistance of submerged bodies has been exhaustively studied by naval architects, and it has been shown that a properly shaped body completely submerged under ideal circumstances with the wave eliminated meets with little resistance besides friction. The fact that a Loon when swimming rapidly on the surface is apt to depress its body in the water so that its back is awash seems to favor this contention. It may be argued that the bird does this to avoid observation or to escape being shot, but it certainly swims faster when thus submerged. Under water the diving bird has a great advantage in being able to assume a shape best adapted to cleaving the liquid medium.

Incidentally it may be remarked that the Loon, in perfecting its legs for use under water, has disabled itself for walking on the land, but as it usually builds its nest on or close to the water, it can well afford to sacrifice terrestrial locomotion.

The combined use of wings and feet, a reptilian form of progression, would naturally be found among birds that had not fully specialized in either direction. Among living birds the Cormorant and the Penguin represent the extremes of specialization for the

posterior and anterior extremity respectively. Where either habit is not firmly established we should expect at times a return to the primitive method, and we should expect to find it in young birds. This is well shown in the case of the Loon. We should expect to find it at all times in beginners in the art of diving, *i. e.*, among birds whose ancestry in the diving line is not a long one. The Mallard, the Black Duck, the Gallinule, the Spotted Sandpiper and the Water Ouzel may perhaps illustrate this contention.

In conclusion the following tentative inferences from these preliminary studies may be set down.

1st. That progression by both the wings and feet under water in diving birds is the primitive method, and is therefore to be looked for among beginners and young birds.

2d. That specialization towards the use of the wings alone leads to a diminution in the size of the wings, and finally to a form of bird that is flightless in the air; for wings of flipper proportions, too small for aerial flight, are more efficient than large wings for subaqueous flight, as witness the Great Auk and Penguins.

3d. That specialization towards the use of the feet alone is probably best adapted for the most rapid progression under water, and this method may leave the wings undiminished in size for use in the air. The apparent exception, *Hesperornis*, with powerful feet but with wings degenerated to vestiges through disuse, serves but to confirm the inference of the superiority under water of feet action alone.

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A REPRINT OF THE ORNITHOLOGICAL WRITINGS
OF C. S. RAFINESQUE.

PART II.¹

BY CHARLES W. RICHMOND.

RAFINESQUE, with his brother, left Leghorn in March, 1802, and landed in Philadelphia on the 18th of April. He at once began to botanize, collect specimens, and make drawings. He says ('Life of Travel,' p. 17): "My brother had become a sportsman, and procured me many birds. I wanted to undertake the Ornithology of the United States, finding many of them new or unknown, or badly described. I continued also to study the Snakes and Reptiles, communicating some of them to Daudin for his work on Reptiles." So, it appears, Rafinesque narrowly escaped being the Father of American Ornithology. However, this plan, like many others projected by him, fell through, and on his first visit to the

¹ For Part I see *antea*, pp. 37-55.

United States he actually published only one item on the native birds, a note on the food of the Canvasback Duck. He lost no time, however, in describing four species of birds from Java, which he found exhibited in Peale's Museum, in Philadelphia. These descriptions he communicated to Daudin, his first scientific correspondent, who inserted them in the 'Bulletin' of the Société Philomathique de Paris, where they appeared as his earliest published writings.

Bulletin des Sciences, par la Société Philomathique, III, No. 67, 1802. (Vendémiaire, an 11 de la République.¹)

[p. 146.]

Notice sur deux nouvelles espèces des genres picoïdes et turnix de l'île de Java, décrites à Philadelphie, dans le cabinet de M. Peales, par le C. RAFINESQUE.

1^o. Le picoïde à dos rouge.

Il est long de six pouces, et diffère essentiellement du picoïde de Sibérie, déjà connu. Le bec est d'un brun clair, avec son extrémité blanchâtre et peu aigue. Le plumage est presque entièrement noir, varié sur la tête de taches oblongues, sur la gorge et la poitrine de taches plus grandes, plus arrondies et toutes de couleur blanche. Le ventre est varié un peu irrégulièrement de blanc et de noir; une bande blanche s'étend de la base du bec aux épaules où elle s'élargit. Le menton est blanc et sans presque aucune tache. Le dos est jaunâtre à sa moitié supérieure, et rouge à l'inférieure. Les couvertures alaires sont d'un jaune olivâtre; les grandes plumes alaires sont brunes, et les petites, brunes, bordées d'olivâtre. La queue a ses plumes noirâtres, acuminées. Les pieds sont brunâtres, avec deux doigts antérieurs, réunis à leur base, et un doigt derrière.

2^o. Un autre oiseau tridactyle, dont M. Peales n'a pas encore pu déterminer le genre: il a quelque analogie par sa forme avec les cailles à trois doigts; mais son bec l'éloigne des Tétrins et des perdrix, et il diffère aussi des pluviers par ses jambes entièrement couvertes de plumes (1).

¹ At this time the society was publishing one number per month. No. 67 was for the period extending from Sept. 22-Oct. 21, 1802.

Il est long de quatre pouces. Son bec est de couleur de corne, comprimé, allongé, avec les deux mandibules convexes, la supérieure ayant son extrémité pointue et dépassant l'inférieure par un petit crochet: les narines sont linéaires et recouvertes par une petite membrane. La tête est brune, pointillée de blanchâtre; le menton et le gosier sont noirâtres; la gorge, la poitrine et les plumes humérales sont fasciées transversalement de blanchâtre et de noirâtre. Le ventre est roussâtre, le haut du dos d'un bai clair, le reste brun fascié transversalement de bai et de noirâtre, ainsi que les couvertures alaires; les plumes alaires sont brunes, bordées de blanchâtre en dehors. La queue est très-courte et brune: les pieds sont cendrés, à trois doigts, tous antérieurs et entièrement séparés, sans membrane.

F. M. D.

(1) Cet oiseau est un turnix, voisin de celui de Madagascar; j'en possède un dessin. (*Note du Redacteur.*)

These birds were not provided with scientific names at the time, but in 1814 (as shown beyond) Rafinesque named them *Picoides* (*Dinopium*) *erythronotus* and *Turnix javanica*, respectively. The first description applies to the bird universally known as *Tiga javanensis*, originally described by Ljungh, in 1797, as *Picus javanensis*; the second is *Hemipodius pugnax* of Temminck, 1815. As the generic name *Tiga* Kaup was not proposed until 1836, it follows that *Dinopium* should replace it, while *Turnix pugnax* will become *T. javanica*.

Bulletin des Sciences, par la Société Philomathique. III, No. 68, 1802. (Brumaire, an 11 de la République.¹)

[p. 153.]

Notice sur une hirondelle et un figuier de l'île de Java, décrits à Philadelphie, dans le muséum de M. Peales, par le C. RAFINESQUE.

I^o. L'hirondelle à longues ailes. *Hirundo longipennis*.

Elle est longue de sept pouces et demi; le bec est petit et noir. Le dessus du corps est noirâtre, à reflets bleuâtres; tout le dessous du corps, ainsi que le bas du dos, sont d'un cendré sali. Les ailes

¹ Brumaire, an 11, extended from Oct. 22–Nov. 20, 1802.

sont très-longues, très-aigues et noirâtres, à reflets. On voit une tache remarquable, cendrée ou blanchâtre, salie intérieurement vers le dos. La queue est noire, très-longue, très-fourchue, avec la penne extérieure de chaque côté aussi longue que les ailes.

2°. Le figuier à queue cunéiforme. *Sylvia cuneata*.

Il est long de cinq pouces. Le bec est de couleur de corne, avec la mandibule supérieure anguleuse, et presque entièrement brune. Le dessus du corps est d'un gris olivâtre, avec le gosier blanchâtre, les épaules cendrées, la poitrine et le ventre jaunâtres. Les ailes sont courtes, à pennes brunes bordées de grisâtre; plusieurs plumes sus-alaires sont terminées de blanchâtre; la queue est cunéiforme, brune en dessous, avec l'extrémité inférieure des pennes latérales blanche, d'un brun clair en dessus, avec l'extrémité inférieure de chaque autre penne blanche, et marquée d'une tache arrondie d'un brun foncé.

F. M. D.

Hirundo longipennis is the well known *Macropteryx* (or *Hemiprogne*) *longipennis*; and *Sylvia cuneata* is in all probability the species later described by Horsfield as *Prinia familiaris*.

The Medical Repository (New York). Second Hexade. II, No. 2, 1804.

[p. 208.]

CANVASS-BACK DUCK AND ITS FOOD.

Extract of a letter from Mr. C. S. Rafinesque to Dr. Mitchell, dated Philadelphia, Sept. 7, 1804.

"Having seen in the Medical Repository the mention made of the canvass-back duck and its food (Hex. I. vol. v. p. 342), I have paid particular attention to ascertain what both were; and it is with some degree of pleasure I am able to tell you that I have been successful enough to find their true scientific names. The first is certainly the *anas ferina* of the ornithologists, *le milvau* of Buffon and the French authors, which is found in Europe, Asia and America. I have seen it myself in Italy and France, where it is reckoned a good game, but not so dainty as it is thought here. I have examined four of them in Philadelphia, which came from the neighbourhood of

Havre de Grace, where they are still plentiful in winter. When there, I was shown the plant or grass they feed upon, and found it to be the *Valisneria Americana*, a new species, somewhat different from the *Valisneria spiralis* of Europe. It covers the bottom of the shallow parts of the Susquehannah, and the head of the bay, from which its leaves nearly reach the surface of the water. The root shoots, in the fall, fleshy and almost esculent buds or protuberances, which stand during the winter, and are the chief food of the *anas ferina* in those parts. Those that escape them send forth next spring new leaves, and sometimes stems also.—The *Valisneria Americana* is called channel-weed in the river Delaware, and canvass-back-duck-food in the Susquehannah."

In 1810, Rafinesque published his 'Caratteri,' a pamphlet of 105 pages, and doubtless one of the commonest of his works. This was apparently issued in blue paper covers (one copy seen by me is in this state), and without the list of writings that occurs on some of his later tracts.

The matter relating to birds is reprinted below.

Caratteri di alcuni nuovi generi e nuove specie di Animali e Piante della Sicilia con varie osservazioni sopra i medesimi. Opuscolo del Sig. C. S. Rafinesque Schmaltz. Palermo. 1810. (Dedication dated "Palermo 1. Aprile 1810.")

[p. 5.]

CAPITOLO II.—GLI UCCELLI

2. *Sp. FALCO Erythrurus* — Tutto bigio con il groppone e le coscie rosse ferruginose, rostro giallastro, nero alla punta, piedi e cera arancini.— *Oss.* questo piccolo *Falcone* o più tosto *Smeriglio* é raro, lo ho sentito nominare *Falco Palumbo* da alcuni Cacciatori, egli si ritrova vicino a Palermo e giunge appena alla lunghezza di un piede; è molto grazioso e ben distinto da qualunque altra specie del numeroso genere a cui appartiene.

3. *Sp. ARDEA Xanthodactyla* — Tutta bianca,

con un ciuffetto cadente dietro la testa, rostro e piedi neri, diti ed iride gialli, spazio nudo frà il rostro e l'occhio cerulescente.— *Oss.* Questo *Airone* appartiene alla divisione delle *Garzette* ed arriva alla lunghezza di tre piedi, fù ucciso vicino a Licata e ho cognizione che si ritrova pure in Egitto ed in Toscana, dove è di passaggio come in Sicilia.

4. *Sp. ARDEA Lucida* — Tutta bianca lucente, con ciuffetto, rostro, e piedi gialli, spazio nudo fra il rostro e l'occhio bigio — *Oss.* Quest'altra *Garzetta*
[p. 6.]

fù ritrovata vicino a Trapani ed è di minor mole della precedente; è pure di passaggio.

5. *Sp. TRINGA Picta* — Rostro nero, piedi olivastri, al di sopra fosca macchiata di bianco, al di sotto bianca macchiata di fosco al petto e fianchi, penne dell'ale fosche marginate di bianco e fosco — *Oss.* Si chiama dalli Cacciatori *Gadduzzu dipintu*, e non é rara in primavera.

6. *Sp. EMBERIZA Atrata* — Rostro, piedi, dorso e fianchi nerastri, fulvastra al disotto, penne della coda nere, l'esteriori marginate di bianco.— *Oss.* Questa sorte di *Ortolano* è raro e di passaggio nella primavera ed età.

7. *Sp. FRINGILLA Olivacea* — Tutta olivastra, un poco macchiata di fosco sopra il dorso, e bianchiccia al ventre, rostro e piedi fulvi, penne della coda marginate di fosco.— *Oss.* Ho trovato questo *Pinzone* vicino a Palermo.

8. *Sp. MOTACILLA Erythroürus* — Bigia al disopra, faccia, gola, petto, rostro e piedi neri, ventre biancastro, groppone e coda fulva, le sue penne interiore fosche.— *Oss.* Questo Uccellino si chiama in siciliano *Cudirussa* come pure la *M. Phenicurus* che pure vi si ritrova e di cui differisce nel non avere ne la fronte bianca ne il petto fulvo &c. ambidue appartengono al vero genere delle *Motacille* ultimamente riformato col tozlierne tutte le *Capinere*, per formarne il Genere *Sylvia*.

9. *Sp. SYLVIA Fulva* — Fulva ferruginosa, biancastra al disotto, groppone giallastro, rostro e piedi bianchicci. — *Oss.* Questa é una della grande specie di *Capinere*, frequenta le montagne e piccoli boschi, e vi é stabile.

10. *Sp. SYLVIA Juncidis* — Penne fosche marginate di fulvastro al disopra, gola, spalle, fianchi e coscie fulvastre, petto e ventre bianchiccio, coda cuneiforma solle penne fosche alla base, nere all'estremità e terminate di fulvo, le due più esteriori lo sono di bianco; uno spazio nudo fra l'occhio e l'orecchie, rostro fosco, piedi bianchicci. — *Oss.* Mo visto questa piccola *Capinera*

[p. 7.]

vicino alla Roccella saltellare sopra i giunchi nei luoghi, umidi; l'avevo pure osservata nelle vicinanze di Livorno, insieme colla seguente.

11. *Sp. SYLVIA Capinera* — Sommità del capo e gote nere, dorso fosco testaceo, al disotto bianco cenerizio, penne della coda nere, l'esteriori marginate e terminate di bianco, rostro fosco, piedi fulvi. — *Oss.* Essa appartiene alla divisione delle *Capinere* col capo colorito al disopra e si distingue della *S. Atricapilla* nell'avere il nero più esteso, nel colore dei piedi, dell'ale &c,

12. *Sp. SYLVIA Xanthogastra* — Bigia olivastro al disopra, gialla al disotto, ale e coda fosche, rostro fosco al di sopra, giallastro al di sotto, piedi piombini. — *Oss.* Questo piccolo Uccellino è molto grazioso, egli si ritrova nell'autunno insieme colli quattro sequenti, e vengono tutti confusi sotto il nome di *Beccaficu* che allora si da a tutte le *Capinere* che mangiano i fichi.

13. *Sp. SYLVIA Rhodogastra* — Bigia scura al disopra, rosastra al disotto, rostro, ale e coda fosche, le penne esterne della coda terminate di bianco, piedi fulvini.

14. *Sp. SYLVIA Turdella* — Bigia rossiccia scara, biancastra al disotto, rostro e piedi foschi.

15. *Sp. SYLVIA Meleuca* — Capo nerastro al di sopra, dorso fulvo fosco, biancastra al disotto, rostro nerastro, piedi fulvi foschi, penne dell'ale fosche, penne della coda nere e l'esteriori bianche all'estremità.— *Oss.* Essa ha qualche somiglianza colla *S. Capinera* n. 11; ma è più piccola, hà il nero del capo diversamente esteso &c.¹

Précis des découvertes et travaux Somiologiques de M^r. C. S. Rafinesque-Schmaltz, entre 1800 et 1814. (Consists of a letter addressed to "M^r. Ch. H. Persoon M.D." of Paris, and dated June 3, 1814.)

The only ornithological matter in this work appears to be the following, on page 14:

2. *Classe Ornithia — Les Oiseaux.*

8. *Esp. Numenius aterrimus.* Bec, pieds et tout le corps parfaitement noir.— Obs. En Sicile, vulgairement *Addarana*.

9. *Sylvia Azuricollis.* Bec et pieds noirs, dos gris-brun, cou et partie supérieure du poitrail azurés, la partie inférieure rougeâtre, ventre olivâtre.— Obs. En Sicile et en Espagne.

10. *Falco torquatus.* Bec bleu, cere pieds et dos bruns, demi collier roussâtre, blanc en dessous avec des taches brunes sur le ventre, queue rayée de ferrugineux.— Obs. En Sicile, vulgairement *Falchettu*.

The 'Précis,' 'Principes fondamentaux,' and 'Analyse' were originally issued in brown paper covers, on the second and following pages of which is given a list of the author's writings. The first item being of interest to ornithologists is here reproduced:

[p. 2 of cover.]

I. Description de 4 nouvelles espèces d'Oiseaux de l'Ile de Java, observés dans le museum de Mr. Peale à Philadelphie,

¹ I have not attempted the identification of the above species, nor of the three that follow.— C. W. R.

Turnix javanica, *Dinopium* (*Picoides*) *erythronotus*, *Hirundo longipennis* et *Sylvia cuneata*.— Inséré dans le Bulletin des Sciences 1803, num. 67. et 68.¹

Turnix javanica, *Dinopium* (*Picoides*) *erythronotus*, and the generic name *Dinopium* are new here.

Principes Fondamentaux de Somnologie, 1814.

The only items of interest to ornithologists are the substitution of two names, *Anseria* and *Apodium*, for *Anser* and *Apus*, viz.:

[p. 27.]

Obs. Cette règle se lie avec la précédente & elles se supportent réciproquement, les Genres *Talpa* L. & *Catalpa* J. *Bromelia* L. & *Melia* L. *Cancer* L. & *Anser* Brisson, *Sinapis* L. & *Apis* L. en sont des exemples; il faut dans tous les cas semblables conserver le nom antérieur (à moins qu'il ne soit d'ailleurs moins convenable) & modifier les autres; ainsi il faudra adopter *Catalpium* R. *Ananas* T., *Anseria* R. & *Apicula* R. au lieu de *Catalpa*, *Bromelia*, *Anser* & *Apis*.

[p. 28.]

Obs. Ainsi *Mitella* L. *Mitchella* L. & *Michelia* L. peuvent être conservés; mais parmi *Apis* L. *Apus* Cuvier, *Apium* L. & *Apion* Herbst, on ne doit conserver qu'

[p. 29.]

Apium L. les autres doivent être changés en *Apicula* R. *Apodium* R. & *Apionus* R.

Specchio delle Scienze o Giornale Enciclopedico di Sicilia. Tom. II, No. XI, I Novembre, 1814.

[p. 132.]

Arrivo delle Lodole vicino Palermo nell'autunno.

Le Lodole (*Alauda vulgaris* L.) sono degli uccelli

¹ These numbers were published in 1802, as noted above.

migratori, i quali vivono e nidificano nell'està sopra il continente europeo, ma lo lasciano nell'autunno, almeno in gran parte, per albergare nell'inverno in Sicilia e nella Barberia. Il loro arrivo principia in Sicilia circa l'equinozio d'autunno, ed il loro passaggio dura quasi un mese: trà tutte le parti della Sicilia non vi è luogo dove giungano in simile abbondanza come nel golfo di Palermo, volano in piccole bande di 20 sino a 50, ma il numero di queste bande è tale che nei giorni di passaggio abbondante, pare che venissero alla fila l'una dell'

[p. 133.]

altra: l'ora del passaggio dura tutto il giorno, ma il tempo più abbondante è dopo il mezzodì, particolarmente quando soffia un moderato vento di tramontana, grecale o maestrale, con un altro vento giungono in piccolissimo numero, e non ne arriva quasi mai con un vento impetuoso o collo scirocco e libeccio. Volano a fiore d'acqua e con volo lento ma uguale, e non s'innalzano nell'aria che quando giungono sopra la riva. Io hò calcolato che nelle giornate di gran passaggio ne devono giungere quasi un milione, e sicchè si può supporre ragionevolmente che in tutta la stagione arrivano in Sicilia nel solo golfo di Palermo (spazio al più di 20 miglia) più di dieci milioni di Lodole.

Questo passaggio somministra ai palermitani una piacevole ed abbondante caccia; un numero sorprendente di cacciatori di spargono sopra tutto il litorale, o vanno in barche ad incontrarle nel mare; vi sono in certe giornate quasi cento barche nel golfo e più di tre cento cacciatori sulle rive, i quali fanuo quasi un fuoco continuo di modo che le vicinanze di Palermo presentano l'aspetto ed il rumore di una battaglia o vivo attacco di fucilate: alcuni trà questi cacciatori giungono ad ammazzare un centinaio di Lodole in poche ore. Il nome che essi hanno in Sicilia a questi uccelli è quello di *Lonora*. Non pare che il rumore delle fucilate le spaventi a gran distanza, giacchè continuano a venire dove vi è il più vivo fuoco; ma da vicino fà deviare le bande del

loro corso o le fa spartire, fuggendo di quà e di là ed anche ritornando nel mare, ma per rintracciare un punto del lido meno pericoloso. Essendo stanche del loro viaggio cadono facilmente, anche se sono debolmente colpite o ferite, e rimangono a galla sopra l'acqua dove si colgono agevolmente.

Quelle che scappano a questo macello, si spartono e vanno ad albergare nelle pianure e pascoli, dove altri cacciatori vengono a perseguitarle; ma nondimeno vi sono più difficili a rintracciare e colpire, cosicchè molte scappano a tutti i loro nemici, e nella primavera la maggior parte lascia la Sicilia per ritornare nell'Italia e nel

[p. 134.]

continente: la loro partenza è però più segreta del loro arrivo, i loro persecutori non hanno quindi scampo di disturbarla.

American Monthly Magazine and Critical Review. IV, No. I, Nov., 1818.

In an article entitled "Museum of Natural History," Rafinesque gives an account of various new genera and species of animals, plants, etc., among which appears the following:

[p. 41.]

I. N. G. *Rimamphus*. (A bird. Natural family of *Leptoramphous*.) Bill subulate, mandibles convex, leaving an opening between them, the lower one straight, the upper one longer, curved, and not notched, nostrils naked. *Rimamphus citrinus*. (Citron Open-bill.) General colour of a citron yellow, back rather olivaceous, five brown and raised feathers on the bend of the wings, quills tipped with brown, bill and feet flesh-coloured. A beautiful little bird, about 5 inches long, the tail, which is truncate, is one inch and an half, the wings are short. It is a native of the south, and was shot near the falls of Ohio, in Indiana, in the month of July. Very scarce. It lives on insects, and darts on them from the trees. It does not sing.

In the next number of this magazine (IV, No. 2, Dec., 1818), there is a continuation of the "Museum of Natural History," with the following paragraph on birds:

[p. 106.]

2. BIRDS. Among them three new genera, *Rimamphus*, *Ramphosteon*, and *Symphemia*, and at least 38 new species have been ascertained. These belong to the following genera: — *Philomela*, 8 species; *Cuculus*, 1; *Troglodytes*, 1; *Sylvia*, 2; *Muscicapa*, 2; *Perdix*, 1; *Rallus*, 1; *Talco*, 7; *Mergus*, 3; *Anas*, 5; *Phalaropus*, 1; *Tringa*, 2; *Charadrius*, 2; *Podiceps*, 1; *Himantopus*, 1, &c.

Journal de Physique, LXXXVIII, Juin, 1819.

PRODROME

De 70 nouveaux Genres d'Animaux découverts dans l'intérieur des États-Unis d'Amérique, durant l'année 1818;

Par C. S. RAFINESQUE.

[p. 418.]

II^e CLASSE. OISEAUX.

3. RIMAMPHUS. Bec subulé entr'ouvert, mandibules rondes, la supérieure très-courbée, vibrissées; narines nues, etc. Famille des Leptoramphes ou Fauvettes. 1 espèce du Kentucky. *R. citrinus*. Jaune citron, dos olivâtre, bec et pieds incarnats, ailes courtes, 5 plumes brunes, relevées au fouet de l'aile; insectivore; il ne chante pas et s'élance des arbres sur sa proie.

4. HELMITHEROS. Différent du genre *Sylvia* par bec un peu courbe, mandibule supérieure arrondie non échancrée. Le type de ce genre est la Fauvette vermivore, ou Wormeater Warbler de Wilson, que je nomme *H. migratorius*.

5. SYMPHEMIA. Différent du genre *Tringa* par bec cylindrique, doigts semi-palmés. Type *T. semi-palmata* que je nomme *S. atlantica*. Il y en a une autre espèce en Kentucky qui peut se nommer *S. melanura*.

Annals of Nature or Annual Synopsis of New Genera and species of Animals, Plants, &c. discovered in North America. First Annual Number, for 1820. (Introduction dated March 1, 1820.)

[p. 4.]

II CLASS. ORNITHIA.—THE BIRDS.

13. *Milvus leucomelas*. White, unspotted, top of the head and part of the back, wings, tail and bill black, feet yellow.— It is found in west Kentucky and Illinois, it feeds on fishes, and is therefore called Fishing Hawk; size small, tail quite forked.

14. *Ardea phaioma*. Entirely of a deep brown, neck ferruginous behind, white before, bill black, feet yellow.— It lives in Missouri, Illinois and west Kentucky; it is of a small size, total length about eighteen inches; it belongs to the tribe of Bitterns.

15. *Charadrius viridis*. Entirely of a light green, unspotted, wings and tail tinged with brown, bill and feet black.— It has been seen by Mr. Audubon in Missouri, near St. Genevieve; it is a solitary and very wild bird, size of the common Plover. Is it a *Fulica*?

16. *Hirundo phenicephala*. Head scarlet, back grey, belly white, bill and feet black.— A fine and rare swallow, seen only once by Mr. Audubon, near Hendersonville in Kentucky; it must have been a wanderer, and is probably a native of Louisiana or Mexico.

The descriptions of Nos. 15 and 16 are thought to be those of imaginary birds, furnished by Audubon, who imposed on Rafinesque in several other instances. Audubon's opinion of Rafinesque is duly recorded in one of the sketches in his 'Ornithological Biography' (I, 1832, pp. 455-460).

Annales Générales des Sciences Physiques (Bruxelles), VII, "1820" (1821),

Sur quelques Animaux hybrides. Par M. C. S. Rafinesque. Pp. 85-88.

The only reference to birds in this article is the following:

[p. 88.]

L'oie du Canada ou oie à cravatte (*Anser canadensis*) a été complètement apprivoisée dans les Etats-Unis, où elle existe en parfaite domesticité. Elle s'est unie presque aussitôt avec l'oie domestique, et a produit des individus féconds, lesquels ont produit de nouveaux métis féconds, par le croisement des races; ils participent plus ou moins de la nature des espèces dont ils proviennent, à mesure qu'ils s'éloignent des types originels. Cependant l'oie à cravatte a été regardée comme une espèce distincte par tous les naturalistes, et même par Buffon, quoiqu'il fût si porté à restreindre le nombre des espèces par esprit de système.

La même union féconde a lieu entre le canard domestique et le canard musqué, quoique ce dernier diffère si essentiellement du premier, qu'il devrait peut-être former un genre, ou sous-genre à part, à cause surtout de sa tête caronculée. Ils diffèrent entr'eux certainement autant ou plus que les aras ne diffèrent des perroquets dont ils ont été séparés.

Atlantic Journal, and Friend of Knowledge, I, No. 2, "Summer of 1832"

p. 63.]

10. ORNITHOLOGY.—Description of a new Eagle from South America, *Aquila dicronyx* or Macarran Eagle. By C. S. R.

Mr. Macarran of Philadelphia has had for 5 years in his small menagerie and botanic garden, a beautiful eagle, kept alive in a cage in the open air during the coldest winters, being a native of the cold climate of Antarctic America. He was found by the mate of a vessel near Buenos Ayres, while yet young, feeding on a dead horse, and taken alive without much difficulty. He has grown and improved in colors since bought by Mr. Macarran. Although fierce and wanting to fly against the boys when they annoy him, he is very tame and grateful towards his keeper: he knows him as well as friendly visitors, and greets them by peculiar postures, looks or cries. He has several kinds of cries rather harsh, to express joy or anger. He feeds on every kind of flesh, offals or even fish and dead animals. He will kill rats and eat them. He is a beautiful noble bird, when he expands the wings they fill his large cage. His gait is clumsy and he oftener jumps than walks.

I have called him *Aquila dicronyx* from the singularity of claws of two

colors.

Aq. dicronyx. spec. ch. Bill horny, feet yellow, claws black, but the middle claw horny or whitish; plumage blackish, head greyish, tail whitish, end of it rusty.

Description.—Total length 3 feet, wings expanded, 9 feet; bill large strong 4 inches long, shaped as in the eagles, of a horny or whitish-yellowish color; cere and lore brownish; eyes black and bright, iris yellow; head greyish above and across the eyes, nearly white beneath and above the eyes; feathers nearly black with a lead colored cast, white at their base; wings slate colored beneath; Uropygial feathers mixt of black and grey. Tail with a rusty band at the end. Feet yellow very strong, feathers not quite to the toes. Claws strong and black, that of the middle toe same color as the bill.

When younger this bird was entirely of a bluish black, or dark lead color, the head and tail have since changed, but the rusty band of the tail and claws were permanent and are prominent distinctions between this eagle and the whitehead eagle.

Mr. Audubon admired this eagle and wanted to purchase him; but Mr. Macarran would not take less than \$100 for him.

This appears to complete the list of Rafinesque's ornithological writings. I have not, however, consulted his "Enumeration and Account of some remarkable Natural Objects in the Cabinet of Professor Rafinesque,"¹ published in Philadelphia, in 1831. This work, we learn from an advertisement on the back cover of his 'Life of Travel,' was "sold to Zoologists and Oryctologists, for 25 cts."

¹ Dr. Allen has recently written me that there is no ornithological matter in this work.

A CAROLINA WREN INVASION OF NEW ENGLAND.¹

BY CHARLES W. TOWNSEND, M. D.

PRIOR to the summer of 1908, the Carolina Wren, *Thryothorus ludovicianus*, has been but an accidental visitor in New England north of Rhode Island and Connecticut, and a rare summer visitor in these two southern States. Beginning with the summer of 1908 reports of this bird in the vicinity of Boston and in other parts of New England became so frequent, that it has seemed worth while to collect as many as possible of these reports, in order to determine the extent of what may be called an invasion into the Transition Zone of this Upper Austral bird. The cause or causes of this invasion I shall not attempt to decide, but it is natural to suppose that unfavorable conditions in the South, or favorable conditions in the North, or both combined may have been causative factors; or, on the other hand, that such favorable conditions existed in the South that the birds increased and survived beyond their normal belt with a resulting overflow to unoccupied area. In any event, the abnormally mild winter of 1908-'09 was favorable to the stay of this bird in a region north of its usual winter area. It can hardly be expected that the Carolina Wren will make the extension of its range permanent, for it is probable that in past times before records were kept, the same or similar favorable circumstances for extension have occurred, yet the extension has not been permanent.

Before recording the occurrence of the Carolina Wren in New England during the last year, *i. e.* from May 1, 1908, to May 1, 1909, it may be well to give briefly the previous standing of this bird in the different States.

Maine: two records, one of a breeding pair.² *New Hampshire*: two records.³ Mr. Charles F. Goodhue of Penacook, N. H., writing under date of April 23, 1909, adds a third record for the State. He says: "I have a fine male in my collection taken at Webster, N. H., April 25, 1902, which is, so far as I can learn, the second

¹ Read before the Nuttall Ornithological Club, May 3, 1909.

² O. W. Knight, *The Birds of Maine*, Bangor, 1908, p. 585.

³ G. M. Allen, *A List of the Birds of New Hampshire*, Manchester, N. H., 1903, pp. 172, 173.

specimen ever taken in the State. *Vermont*: "A rare visitant in the southern part of the State."¹ No definite record. Bennington? Cutting." *Massachusetts*²: "A very rare visitant from the South." Some six records and also a pair thought to be breeding are given by Howe and Allen.³ Since the publication of this record and prior to the present invasion, there have been four records of a single bird and one of a breeding pair reported in 'The Auk.' *Rhode Island*: "A very rare summer resident"; one breeding record.⁴ Since the publication of the above, the Carolina Wren appears to have been a fairly regular visitor and to have occasionally bred in southern Rhode Island. *Connecticut*: Dr. Louis B. Bishop, in a letter dated April 15, 1909, kindly wrote me as follows: "I have no records of the occurrence of the Carolina Wren in Connecticut before 1891. . . . Mr. W. H. Hoyt of Stamford informed me that two were taken there in the fall of 1891 and it had been frequently noticed since, and that he believed it then occurred regularly. Mr. John Schaler of Stamford gave me much the same information, but he did not find it till 1894. Mr. W. R. Nichols of Branford told me on June 6, 1894, that a pair had bred in Branford for several years, but had not been seen that year, their breeding place having been cut over. Between New Haven and Guilford I found them in the fall of 1902, the two collected being young birds, and noted two in the fall of 1903. From then I have no record of the Carolina Wren in Connecticut until those reported by Mr. Clifford Pangburn in this April 'Auk,' and I believe the cold winters of 1903-4 and 1904-5 exterminated them."

In the following report it is sometimes difficult or impossible to determine whether the same bird has been seen in two nearby localities, or whether two different birds have been observed. In some cases it seems probable that different birds have been found, owing to the relatively stationary habits of the Carolina Wren and its restricted feeding area, while in other cases this point is definitely

¹ G. H. Perkins and C. D. Howe, *A Preliminary List of the Birds found in Vermont*, New York, 1901, p. 116.

² R. H. Howe, Jr., *Review of Perkin's Birds of Vermont*, Longwood, Mass., 1902, p. 21.

³ R. H. Howe, Jr., and G. M. Allen, *The Birds of Massachusetts*, Cambridge, Mass., 1901, p. 92.

⁴ R. H. Howe, Jr., and E. Sturtevant, *The Birds of Rhode Island*, 1899, p. 84.

settled by the observation of the two birds at the same time in the two areas. Only two of the birds are reported to have been shot, but fortunately the definite character of the shape, markings and action of this bird, as well as its characteristic call notes and song, have made its identification easy and certain. Besides those reporting the Wrens numerous other bird-students have had the opportunity to study these interesting and entertaining birds. One cannot help comparing the reception of these birds to-day, with their probable fate twenty years ago or less, had the invasion occurred then.

MAINE.—A male Carolina Wren was first seen at *Falmouth*, Maine, on August 18, 1908, by Mr. Ernest Brewer. From that date to October 3 it was seen by numerous observers. On October 3 it was shot by Mr. Arthur H. Norton, and the specimen is now in the collection of the Portland Society of Natural History.¹

NEW HAMPSHIRE and VERMONT.—I have been unable to obtain any record for the occurrence of the Carolina Wren in these States during the last year. For this negative report as regards New Hampshire, I am indebted to Dr. Glover M. Allen, Mr. Francis G. Blake, Mr. C. F. Goodhue, and Mrs. W. R. Varick; as regards Vermont, to Prof. G. H. Perkins.

MASSACHUSETTS.—Mr. Ralph Hoffmann tells me that no Carolina Wren has been noted in the *Berkshires* as far as he can learn. Mr. R. O. Morris of *Springfield* writes me under date of April 20, 1909: "There are no records that have come to my knowledge, and I doubt if the invasion extended to this part of the State."

In the eastern part of the State, especially in the vicinity of Boston, records abound. At *Ipswich*, Mr. A. C. Bent and I found a Carolina Wren on February 7, 1909, in a planted spruce thicket near a house close to the sea. I saw the wren again on March 7. It was within a hundred yards of a Cardinal that had been there for a month. Mrs. Lidian E. Bridge saw this wren on February 22 and March 12; on the last named date it was also seen by Mr. H. W. Wright.

In *Middlesex Fells*, a Carolina Wren was seen by Mrs. Bridge on October 3 and 4, 1908, and on March 7, 1909, while one was seen in the same place by Mr. Wright on November 13, and two on November 16, and December 4, 1908.

¹ Journal Maine Ornith. Soc., Vol. XI, 1909, pp. 4-10; also Auk, Vol. XXVI, 1909, p. 82.

At *West Medford*, Mrs. Bridge reported a wren in song observed by Mrs. Ruth Coolidge on August 10, 1908.

At *Concord* one was seen by Mrs. Bridge on October 9, 1908, and Mr. F. B. McKechnie saw one in this town on April 5, 1909. He was told it had been seen in the same locality for two weeks previously.

At *Arlington Heights* Mr. George Nelson saw a Carolina Wren on August 15, 1909, and heard him on August 16.

Cambridge. On September 7, 1909, Mr. Wm. Brewster discovered two Carolina Wrens in his garden, where they remained a week or ten days. They were seen also by Mr. Walter Deane and Mr. H. A. Purdie. In a letter to me from Mr. Brewster dated March 26, 1909, he says of these birds: "I took them to be a pair of fully adult birds. One of them sang rather frequently, especially in the early forenoon. After seeing *them both* in the garden one morning I walked up Sparks Street to a stable on Concord Avenue beyond Huron Avenue and fully a quarter of a mile from our place. On arriving at my destination I heard a Carolina Wren sing several times in a yard next that in which the stable was situated. This bird must have been a different one from the other two. I did not see it."

In *Brookline*, close to Boston, it is apparent that two pairs of Carolina Wrens passed the summer in localities not more than three fourths of a mile apart; both of these pairs came under my observation on several occasions. Of the pair observed at Dudley Street, Miss Blanche Kendall writes me as follows: "I first heard and saw the Carolina Wren on July the twenty-third, and on the twenty-ninth I discovered that there were two. They remained until the afternoon of December thirteenth when they disappeared during that first heavy snow-storm. We enjoyed seeing and hearing them all summer, and they grew very tame by fall, coming to the suet; on to the windowsill, and even inside the room for seeds and nuts." I saw one of these birds on July 30.

At High and Allerton Streets in the same town a pair of Wrens had been seen and heard by the residents since about July 16, 1908. I saw one or both on July 29, August 18, September 3 and 30. After the last of August they spent the nights in the end of a rolled up matting screen suspended from the roof of the piazza of Dr. F.

P. Denny's house on High Street. I inspected these birds at close range on the evening of September 3, by the light of a wax taper. The two were so rolled up in a ball, with feathers puffed out, that it was very difficult to make either head or tail of them. I touched the tips of their feathers without awakening them. Dr. Denny told me the birds left in the latter part of November.

A third pair of Carolina Wrens in Brookline has been reported to me by Mr. Clarence Little. About October 15, 1908, a pair of these birds appeared at his place on Goddard Avenue, about half a mile from the Dudley Street pair. They remained through the winter and up to the date of his writing, May 1, 1909. On this date he writes: "We have seen them with one or two exceptions every day, and they have been seen chiefly in or around an old woodpile. As yet, however, we have seen no carrying of nesting material."

Jamaica Plain. On Bowditch Hill Dr. Harold Bowditch identified a Carolina Wren on August 23, 1908, which had been singing in the vicinity of his house for several weeks. He recorded its presence in the same place during September, and of two birds there after September 25. Also from that date until March, 1909. He says in a letter of April 5, 1909: "The birds were always recorded within an eighth of a mile of our house, on our place or on one of those adjoining it." These birds were both seen by Mr. F. H. Allen on September 3, 1908.

In another part of Jamaica Plain, Mr. James L. Peters found a Wren on September 21, 1908, which "was seen off and on until nearly the first of November." Mr. Peters considers this was probably the same bird that he found on July 17 in Franklin Park, less than three quarters of a mile away. It is possible that the same Wren may have been noted by Mr. Jack who writes under date of April 19, 1909, as follows: "In October at least one Carolina Wren came on several different dates, about my house on Forest Hills Street, Jamaica Plain, always noted and discovered by its peculiar call, its last visit being noted on November 2."

Mr. C. E. Faxon writes me under date of April 13, 1909, that "Two Carolina Wrens appeared here [at the Arnold Arboretum in Jamaica Plain] this summer about August 1, and stayed about three weeks when they were disturbed by some work going on near

their favorite haunts and moved on. The male sang almost constantly." These birds were also reported by Mr. J. G. Jack.

West Roxbury. Mr. J. S. Codman¹ saw a Carolina Wren in West Roxbury on November 8, 1908, and again on November 26. (Jamaica Plain, the Arnold Arboretum, Franklin Park and West Roxbury are all included in the City of Boston.)

Cohasset. Mr. J. G. Jack has given me the record of a Carolina Wren during the latter part of August and all of September, 1908, at Sandy Cove in Cohasset. After this month Mr. Jack did not visit Cohasset until February 22, 1909, when he again found the Wren in the same spot. Mrs. Bridge found the Wren there on March 17. At Scituate, in the thicket of the Glades, Mr. H. W. Wright found a Carolina Wren singing on April 10, 1909. This spot is about a mile across the water from Sandy Cove.

Naushon Island. On July 13, 1908, Mrs. Bridge found a Carolina Wren in full song at this island. On the following day she discovered that there were a pair of Wrens there, and she heard the male sing on the 15th and 16th. She writes me under date of March 2, 1909: "Later in the season my cousin Mr. Ralph Forbes reported to me several Wrens [at Naushon], probably the young." As Mr. Brewster² reported the nesting of a pair of Carolina Wrens at Naushon in 1901, it is possible that they may nest at this southern station not infrequently.

There have been, therefore, at a moderate estimate during the last year about twice as many Carolina Wrens seen in Massachusetts as have been reported in all previous years.

RHODE ISLAND.—Mr. R. G. Hazard reports the breeding of the Carolina Wren in Rhode Island.³ At *Peace Dale* he found more than one pair during the summer of 1908, but records no nests. July 13 is the earliest date he gives. Mr. Leon J. Cole⁴ found during the summer of 1908 "at least two, and possibly more Carolina Wrens resident at *Kingston, R. I.*" Late in July is his earliest date.

Mr. Edward Sturtevant, under dates of April 17 and April 30,

¹ Bird Lore, 1909, Vol. XI, p. 86.

² Auk, Vol. XVIII, 1901, pp. 397, 398.

³ Auk, 1908, Vol. XXV, p. 480.

⁴ Auk, 1909, Vol. XXVI, pp. 81, 82.

writes me that a pair made their home near his house at Newport last summer, and mentions April 19, 1908, as an early date. This year he has had two in the same place since March 24.

CONNECTICUT.—Mr. A. W. Honywill, Jr., reported in 'Bird Lore Census'¹ a Carolina Wren seen at *New Haven* on December 25, 1908. Mr. C. H. Pangburn² found two Wrens in the same locality at New Haven on December 29, and shot one there on January 2, 1909. Dr. Bishop, in his letter above referred to says: "Mr. Dwight B. Pangburn tells me that he or his brother, Clifford, have seen as many as three at one time this past winter in the region mentioned in 'The Auk'; but that none have been seen since March 10."

I wish to thank the numerous observers who have kindly put their records at my disposal, and have made this report possible.

SOME ORIGINAL MANUSCRIPT RELATING TO THE HISTORY OF TOWNSEND'S BUNTING.³

BY RUTHVEN DEANE.

THROUGH the kindness of the late Mrs. Lucy Audubon Williams,⁴ I am enabled to add a more detailed account of the capture of this unique specimen, as furnished to Audubon by Dr. John K. Townsend⁵ on September 27, 1833. Audubon's first mention of this bird (*Orn. Biog.*, Vol. II, 1834, p. 183, pl. 400; Vol. V, 1839, p. 90) merely states that it was discovered in the vicinity of Philadelphia, and it is not a little strange that he did not give such details

¹ Bird Lore, Vol. XI, 1909, p. 22.

² Auk, Vol. XXVI, 1909, p. 195.

³ *Spiza townsendii* (Aud.), A. O. U. Check-List of North American Birds, second edition, p. 331, 1895. Hypothetical List. "Its peculiarities cannot be accounted for by hybridism, nor probably by individual variation."

⁴ Mrs. Lucy Audubon Williams, born June 30, 1838; died February 21, 1909

⁵ Dr. John Kirk Townsend, born October 10, 1809; died February 6, 1851.

of its capture as was furnished to him by Townsend the previous year, particularly as the bird was new to science.

As Townsend's description, sent to Audubon, is headed "*Emberiza Auduboni* — Audubon's Bunting," he evidently intended to name the species after Audubon, who in turn reversed the compliment, no doubt thinking it should bear the name of its discoverer.

Audubon, in his short account, did not give the date of capture, but we find the following record in Dr. Michener's ¹ '*Insectivorous Birds of Chester County, Pennsylvania*' (U. S. Agricultural Report, 1863, p. 287): "New Garden, 11th of 5th month, 1833.— This morning my friend John K. Townsend, in company with John Richards, while in quest of birds for my cabinet, shot a bunting² in William Brown's cedar grove, near New Garden meeting-house, which is believed to be a nondescript. We have given it the provisional name of *Euspiza albigula*, or white-throated bunting."

Contrary to the above, Townsend, in his original manuscript, now in my possession, gives the date of capture as *12th of June, 1833*. Townsend, however, may have recorded from memory four months later, while we know that Michener's record was taken from his diary.

Accompanying the Townsend manuscript is a verbatim copy in the hand-writing of Mrs. Audubon. Heading this copy, in Audubon's hand, is written, "read on the other side first." On the back of the sheet he had written, to preface Townsend's description, the following:

"On my reaching Philadelphia³ bent on going to the Floridas once more, I had the pleasure of renewing my acquaintance with John K. Townsend Esq. of that city. His zeal for the study of ornithology was unrelented. I saw this in his fine eye whilst he with enthusiastic glee spoke to me of a new bird lately procured by himself. I saw this bird and accepted it to make the drawing now before you, and as its habits are yet unknown, I merely can give a copy of Mr. Townsend's letter to me on the subject."

¹ Dr. Ezra Michener, born 1794; died 1887.

² This mounted specimen was in Dr. Michener's cabinet for twenty-four years. It was then (1857) deposited with the Smithsonian Institution, but was not catalogued (No. 10.282) until May 21, 1858.

³ On September 14, 1833, Dr. John Bachman wrote an urgent letter to Audubon to again visit him at his home in Charleston, S. C. This invitation was accepted and he was evidently on his way there when passing through Philadelphia.

While Audubon had the specimen in hand to color and describe, he evidently used Townsend's description and measurements, though somewhat rearranged. There can be no doubt but that all this was prepared for publication, but for some reason was never used.

Copy of Townsend's Original Manuscript.

"EMBERIZA AUDUBONI.

"Audubon's Bunting.

"I obtained this bird, (which I have honored with the name of our distinguished countryman) in New Garden, Penn. on the 12th of June 1833. It was first observed sitting listlessly upon a fence rail, but upon being approached flew to the top of an adjacent tree from which it emitted a succession of lively notes somewhat resembling the song of the Indigo Bird (*Fringilla cyanea*) but louder and more varied. Its flight was performed by short quick jerks of the wings and undulations of the body. It was with extreme difficulty that I approached sufficiently near to shoot, it being very shy and watchful and passing rapidly from tree to tree. Anxiety to procure it prevented my observing its habits more particularly. I have since visited the spot repeatedly but have never seen another individual.

"Male — Upper mandible black, middle edge white, lower light blue with a longitudinal line of black extending from the point half way to the base; irides light hazel; head dark plumbious, indistinctly spotted with black; cheeks and breast light plumbious; line over the eye white; throat white, with a black line extending from the base of the lower mandible down each side of the neck and terminating on the breast in a few small oval spots; outside the black line on each side of the throat is a broader stripe of white ending with the base of the auriculars; back varied with black and brown; wings plain dusky, the first and second primaries equal and longest, the lesser coverts edged with pale brown; shoulders yellowish white; rump and emarginate tail uniform with the wings; breast tinged with ochreous, the color gradually deepening upon the belly; below and inferior tail coverts brownish-white; legs and feet dusky. Length 5½ inches. Extent 9 inches.

"I was at first inclined to consider this species as identical with the Black-throated Bunting (*Fringilla americana*) setting aside the very considerable dissimilarity which I observed in its habits, voice &c. More particular observations however, and a careful comparison of the individual with descriptions and specimens has convinced me beyond the shadow of a doubt that my bird is new, and in this belief I am sustained by Mr. Audubon than whom there cannot be better authority.

"There is a species described by Vieillot under the name of *Fringilla*

grisea and said to inhabit the U. States which somewhat resembles the present in its markings, but upon comparison they will be found specifically distinct.

"John K. Townsend, Philad.

Sept. 27th, 1833."

[Superscribed]

"John James Audubon Esq."

ANNOTATED LIST OF THE WATER BIRDS OF WELD,
MORGAN AND ADAMS COUNTIES, COLORADO,
SOUTH TO THE FIRST SECTIONAL LINE BE-
LOW THE FORTIETH PARALLEL.

BY A. H. FELGER.

With Three Maps.

EASTERN Colorado has come to rank prominently as a section of our country where water birds, waders, and shore birds may, in suitable localities, be found in abundance. This is attributable in the main to two complementary causes, (1) the close settling of the Mississippi Valley with the attendant drainage of the sloughs and marshes of that region, (2) the construction on the eastern slope of Colorado of great numbers of reservoirs, or artificial lakes, for the purpose of storing water for irrigation. From these reservoirs there extend in all directions through the surrounding farm lands net-works of irrigating ditches, producing luxuriant growths of alfalfa, grains, weeds, and wild grasses, which in turn afford most excellent feeding and breeding grounds for many species. About a great many of the reservoirs, too, has grown dense vegetation consisting of deep borders of sedges, cattails, and rushes, which furnish much desired protection both in and out of breeding season.

This section is, moreover, cut by numerous streams, which collect the melting snow from the eastern mountain slopes and start it on its journey to the Gulf of Mexico. Many of the smaller of these streams, it is true, are dry during the summer, but in the spring, when the northern flight of birds is at its height, their banks in many

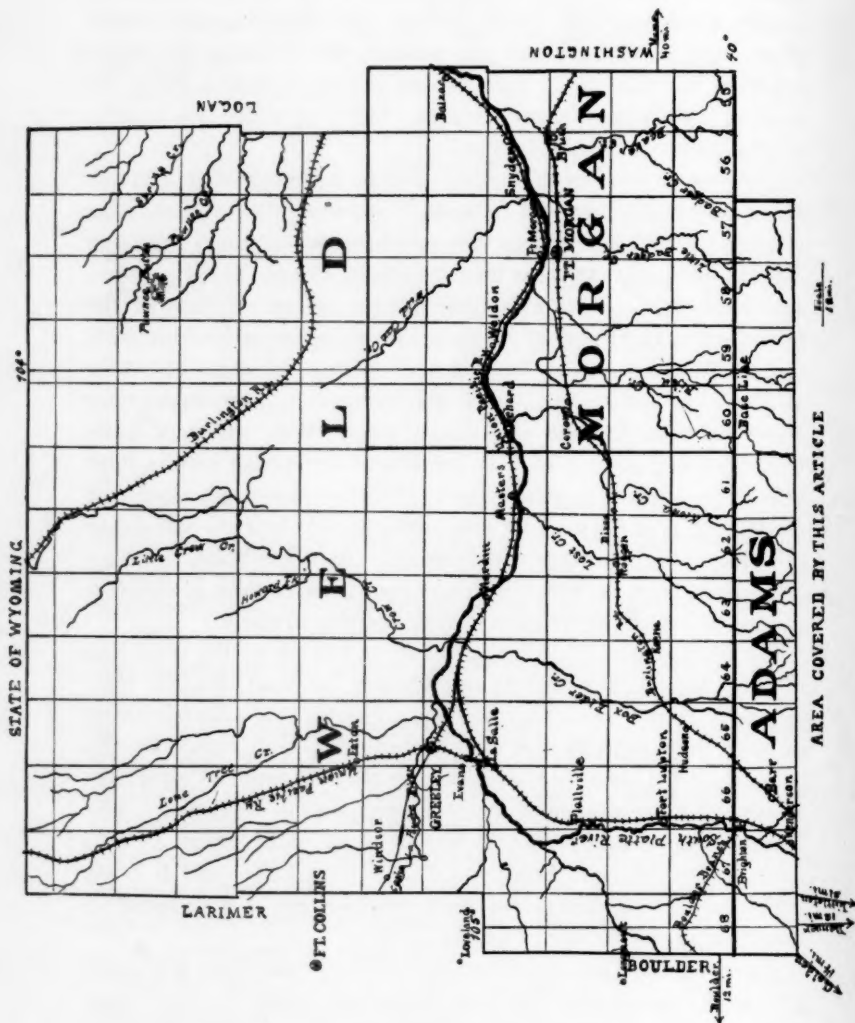
instances are overflowed, causing great areas to be flooded, and furnishing thereby most desirable localities in which water-loving species may pause awhile in their journey. On the other hand, a goodly number of the larger streams, like the Arkansas, South Platte, etc., carry water the year around, and receiving the drainage from the cities along their courses, bear upon their surfaces the cannery and factory waste products, many of which are eagerly sought out by these birds for food.

The area covered by this article occupies a portion of the Eastern Slope very highly adapted to water-frequenting birds; it contains many artificial lakes of large size, is intersected by many irrigating ditches, contains numerous fields of alfalfa and the various grains, and receives via the Platte River all the refuse products of the factories and canneries of Denver. Its elevation varies from 4000 feet to 7000 feet. The hunting and fishing privileges of nearly all the lakes and reservoirs within it are held by gun clubs under leases covering hunting and fishing only. With many of these clubs shooting on the lakes is permitted only during certain days of each week of the hunting season. Whether shooting is permitted on other days of the week, or not, nearly all the clubs are uniform in allowing it on Saturdays and Sundays. As a result, on Saturday afternoons, from the towns within or near the area there is a perfect exodus of hunters to the lakes in their outlying districts.

Within this area, 18 miles northeast of Denver on the main line of the Chicago, Burlington, and Quincy Railroad, lies the little village of Barr. Beginning perhaps a quarter of a mile southwest of Barr there extends in a northeasterly direction, mostly on the east side of the above named railway, a chain of artificial lakes constructed for the storage of water for purposes of irrigation. The largest of these, and in fact the feeders of the entire chain, are two lakes known as Barr Lake and Upper Barr Lake, and it is on account of the prominence of these two lakes that I shall speak of this chain as the Barr Lake Chain.

The contents of this article are based in large part upon a systematic study in the field of the birds of the Barr Lake Chain covering, with a few interruptions, the period from 1898 to 1909, exclusive of the year 1906. During these eleven years I have made many trips between this field and Denver, on numerous occasions making

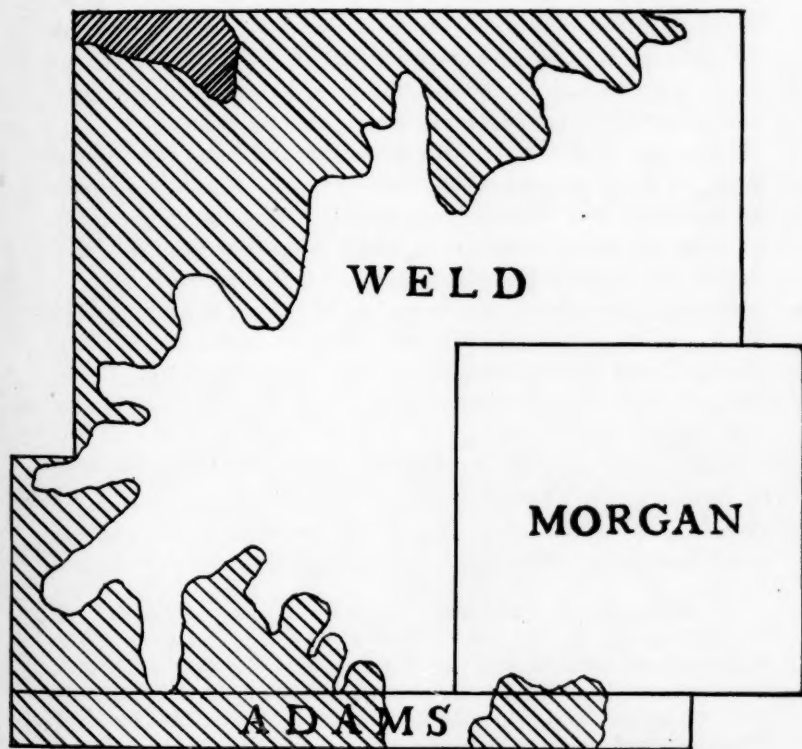
the journey, a distance measured by cyclometer of twenty-five miles by road, on a bicycle, leaving Denver at a very early morning hour



and returning at a very late evening hour. Upon many other occasions the trip has been made by train with a stay of several succes-

sive days on each trip; and upon one occasion the writer rented a house at Barr and took his family there, to be constantly in the field.

Aside from this field work along the Barr Lake Chain, I have, during the past twelve years, including the year 1906, taken many



MAP OF ALTITUDES.

NO SHADING	= UNDER 5000 FT.
COARSE SHADING	= 5000 - 6000 "
FINE SHADING	= 6000 - 7000 "

trips down the Platte River and to other lakes within this area, collecting and taking notes for the list which is now submitted.

In order to give to my readers, especially to those students of ornithology living in proximity to this chain, an idea of the outlines and sizes of these lakes, together with the character of their borders,

I present herewith a detailed map containing measurements personally made. These measurements represent in each case the size of the body of water at the average high water line. They are not assumed to be absolutely accurate, but sufficiently accurate for all ornithological purposes. In taking these measurements I first of all established base lines, then with the aid of a compass I projected upon these base lines the points marking the extreme limits of the lengths and breadths of the several lakes, and stepped off the distances between these projected points. The extreme points of the lakes having thus been established, I sketched in their outlines as best I could from observation while on the ground.

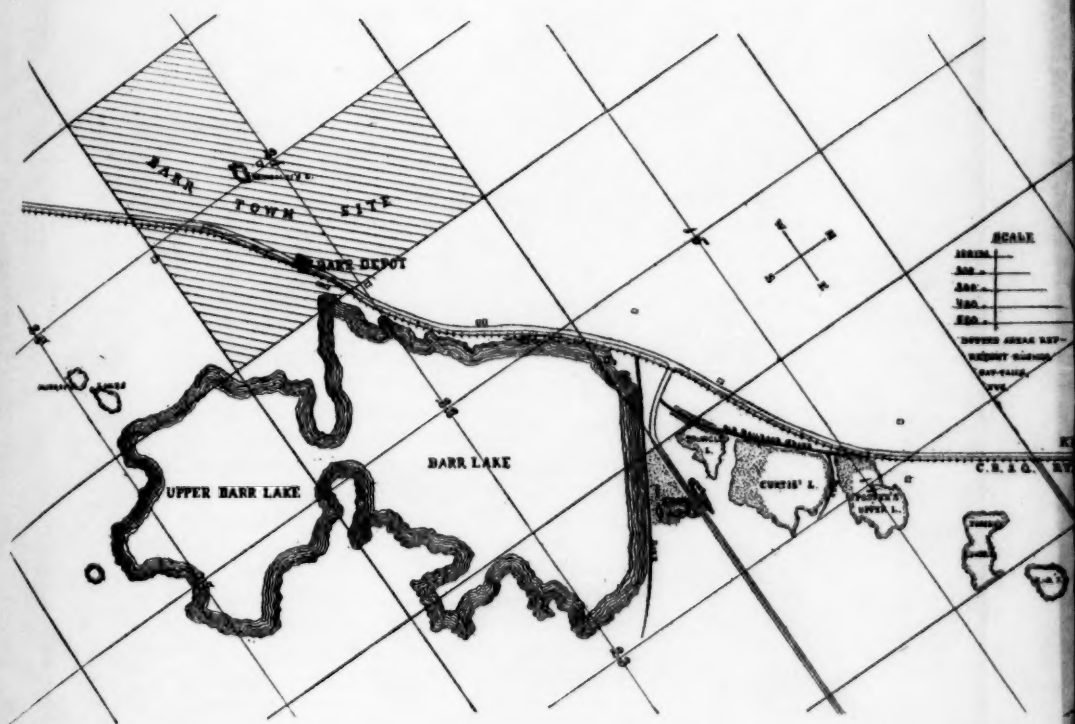
I have included in these notes the earliest and latest dates known to me, of the occurrence of the various species within or adjacent to this area. It is not to be presumed that these dates represent in all cases the extreme periods in which specimens may be found; they are given to serve as a basis for future observations.

Realizing the value to the ornithological student in his field work in any given area of being familiar with the records of species not yet discovered in said area, but noted in adjoining areas, I have deemed it advisable to introduce herein an hypothetical list with notes appertaining thereto.

I have aimed to give proper credit where due by adding the name of the informant wherever a record not my own is used, and I desire in this connection to express my gratitude to those whose names are herein mentioned, for helpful notes.

[1. *Aechmophorus occidentalis*. WESTERN GREBE.— Straggler, rare in adjoining and near-by areas. (Oct. 25-Nov. 9.) A western species found only six times to date east of the range in Colorado: at Sloane's, Marston's, and Tynon's lakes near Denver, reported by H. G. Smith (Nid., III, 1896, p. 48.); at Sheldon's Lake, near Fort Collins, reported by W. W. Cooke (Birds of Colo., p. 191); at Citizen's Lake, near Denver, reported by A. H. Felger (Auk, XXVI, 1909, p. 86). From these near-by records it seems probable that this species will yet be found in the area covered by this article.]

[3. *Colymbus auritus*. HORNED GREBE.— Migrant, very rare in near-by area. (Oct. 8, only date known.) Only three apparently unquestionable records to date for the eastern slope of the State, one at Fort Lyon, the other two at Golden. (Birds of Colo., pp. 49, 155.) All these birds were observed at points south of this area, and since it is a northern species coming south in the winter, it should be found here.]



SKETCH MAP OF THE BARR LAKE

4. **Colymbus nigricollis californicus.** AMERICAN EARED GREBE.— Summer resident; very common locally. (April-Oct. 22.) Breeds in considerable numbers all along the Barr Lake Chain. Begins laying in latter part of April or first part of May. The writer has found by May 19 sets of as many as eight and nine eggs advanced in incubation. In all of the sets incubation had at least begun, but in the majority it was from one fourth to three fourths complete.

6. **Podilymbus podiceps.** PIED-BILLED GREBE.— Summer resident; very common locally. This species is usually found associated with the former, and in many cases in almost equal, if not equal, numbers. The remarks made in regard to the former species will apply equally to this species.

7. **Gavia immer.** LOON.— Migrant; rather rare. (March ?, April 15-May 7; Sept. 18-about Dec. 1.) Seen oftener in fall than in spring, usually in ones or twos, but the writer has one record of five in a flock. George C. Welch shot one on the Barr Lake Chain, and the writer has two that were shot by B. T. Ames in the same locality. Of the nineteen records that the writer has for this area and adjoining and near-by areas, fourteen are noted for the fall.

[8. **Gavia adamsi.** YELLOW-BILLED LOON.— Migrant; very rare in adjoining area. (May 25, only date.) One specimen, the only record for Colorado, was taken by W. G. Smith, May 25, 1885, near Loveland. (Birds of Colo., p. 155.)]

[37. **Stercorarius parasiticus.** PARASITIC JAEGER.— Migrant; very rare in adjoining localities. (Fall to early winter.) There was one in the Maxwell collection, taken at Boulder in December of some year prior to 1874; reported by Cooke. (Birds of Colo., p. 50.) H. G. Smith reports one at Sloan's Lake in the fall of 1889. (Nid., III, 1896, p. 48.)]

[40. **Rissa tridactyla.** KITTIWAKE.— Migrant; very rare in adjoining and near-by areas. (December, only month recorded.) One, the only specimen for Colorado reported to date, was in the Maxwell collection and was taken at Boulder in December; reported by Cooke. (Birds of Colo., p. 50.) Rudolph Borchardt, a Denver taxidermist, stated to me on Feb. 3, 1906, that he had received one or two of this species to mount during his residence in this city.]

[49. **Larus occidentalis.** WESTERN GULL.— Straggler from the West; very rare in adjoining area. (September, only month reported.) One taken by Prof. Wm. Osburn, at Loveland, Sept. 30, 1889; reported by Cooke. (Birds of Colo., p. 50.)]

51. **Larus argentatus.** HERRING GULL.— Migrant; rather uncommon. (March-December.) As a rule associated in small numbers with Ring-billed Gulls, but sometimes in small flocks by themselves. Eight birds is the most that I have ever seen together here. One may expect to see an occasional specimen at any time when the Ring-bills may also be found.

[53. **Larus californicus.** CALIFORNIA GULL.— Straggler from the West; very rare in adjoining area. (May, only month reported.) One taken by Prof. Wm. Osburn, at Loveland, May 7, 1890. (Birds of Colo., p. 51.)]

54. *Larus delawarensis*. RING-BILLED GULL.— Common in migration and in summer, but not known to breed. (About March 10-about November 15.) Flocks of from five to seventy-five may be noted in mid-summer at almost any time along the Barr Lake Chain.

[58. *Larus atricilla*. LAUGHING GULL.— Migrant; very rare in near-by district. (December, only month recorded.) Colorado's only record is that of a specimen taken at Sloan's Lake, Denver, in December, 1889, and reported by H. G. Smith. (Nid., III, 1896, p. 48.)]

[59. *Larus franklini*. FRANKLIN'S GULL.— Migrant; rare in adjacent and near-by localities. (May 8; about November 12.) One taken by W. G. Smith, at Loveland, and one reported by A. W. Anthony as having come from near Denver; both recorded by Cooke. (Birds of Colo., p. 51.) Hugo Todenwarth, a Denver taxidermist, reports that on November 13, 1902, he received from W. H. Englesole one of this species in the flesh to mount. Miss Jennie M. Patten reports to Judge Junius Henderson that she saw a Franklin's Gull May 8, 1905, near Yuma.]

[60. *Larus philadelphia*. BONAPARTE'S GULL.— Migrant; rare in adjoining and near-by areas. (Fall, and apparently spring also.) Cooke reports that this species has been taken near Fort Collins, and that it is said to be not uncommon locally, adding that nearly all were taken in the fall. (Birds of Colo., pp. 51, 193.)]

[62. *Xema sabinii*. SABINE'S GULL.— Migrant; rare in near-by and adjoining districts. (October 1-December.) Cooke mentions five specimens from Denver, Boulder, Loveland, and Fort Collins, all noted from October to December. He also states that E. L. Berthoud says that these gulls were not uncommon in early days, but have disappeared in late years. (Birds of Colo., pp. 51, 155.) Two of the above are records of H. G. Smith's, one for October 1, and the other bearing no date. (Nid., III, 1896, p. 48.) I have in my collection a young bird presented to me by Hugo Todenwarth. It was shot November 17, 1902, supposedly near Denver; collector unknown to the writer.]

69. *Sterna forsteri*. FORSTER'S TERN.— Summer resident. (April-October 7.) In summer, common locally; more common in migration. Quite a number breed regularly along the Barr Lake Chain upon the lake shores and upon masses of dead, floating cattails and rushes. Have noted flocks of one hundred, or more, in May, and flocks of from thirty to forty through June and July. Have taken sets of eggs on May 19, in none of which was incubation begun.

[71. *Sterna paradisaea*. ARCTIC TERN.— Migrant. (Spring-July 9) Very rare in adjacent and near-by localities. Cooke states that Wm. Osburn has an adult male taken at Loveland July 9, 1889 (Birds of Colo., p. 51.) H. G. Smith states that one was shot near Denver in the spring of 1887. (Nid., III, 1886, p. 48.) There are no other Colorado records.]

77. *Hydrochelidon nigra surinamensis*. BLACK TERN.— Summer resident. (April-October.) Common locally both in summer and in migration. Breeds along the Barr Lake Chain in localities similar to those of Forster's

Terns. Have seen flocks of as high as one hundred twenty-five in May and flocks of from twenty to sixty in June and July.

120. **Phalacrocorax auritus.** DOUBLE-CRESTED CORMORANT.—Migrant. (March 20-?; about October 1-November 23.) Rare in adjacent and near-by localities. H. G. Smith records a flock of about twenty from Sloan's Lake, one specimen from Marston's Lake, and one from Jones's Lake, all near Denver. He also records one from "about twenty miles from Denver." (Auk, III, 1886, p. 284, and Nid., III, 1896, p. 48.) I have records of one at Bowles's Lake, near Littleton; a flock of four at Rocky Mountain Lake, in Denver; and one shot by H. W. Theden, of Denver, on November 23, 1903, locality unknown. I have no records for this area, but it doubtless has been present in this region.]

121. **Phalacrocorax vigus mexicanus.** MEXICAN CORMORANT.—Migrant. (Only date, October 15.) Very rare. The only specimen taken in Colorado is one recorded by the writer as being in his collection, it having been taken at Smith's Lake, October 15, 1899. (Auk, XVIII, 1901, p. 189.) This lake lies across the Platte River west of Henderson, Adams County, and is, as far as the writer can determine from information at hand, on the boundary line of this area.

125. **Pelecanus erythrorhynchos.** AMERICAN WHITE PELICAN.—Migrant or summer resident. (About April 15-November 22.) Not common in migration; in summer, rare. Not known to breed, but I place it as a possible summer resident from the following note: Mr. Durward Luper, of Evans, Weld County, informs me that during July, 1906, there was a small flock on a reservoir of 200-300 acres, which lies 3-4 miles from Evans. This flock remained there for some time; just how long, or whether before or after July, I do not know. Nearly every season a flock, sometimes large, sometimes small, frequents the Barr Lake Chain. In the spring of 1903 there was a flock of about twenty on Andre's Lake, one of the Barr Lake Chain, and on May 13, 1905, I counted forty-one on Barr Lake.

129. **Mergus americanus.** AMERICAN MERGANSER.—Winter resident. (Nov. 1-March 16.) Not uncommon in winter, more common in migration. Quite a number remain during the winter along the South Platte River, especially in localities down the river from Hardin, where there are sand bars in mid-river. I have found, as Mr. Cook remarks, that the river about Fort Morgan is a favorite place for them. A few frequent, during the winter, lakes in which there is some open water.

130. **Mergus serrator.** RED-BREASTED MERGANSER.—Winter resident. (About same dates as previous species.) In migration, not uncommon; in winter, uncommon. This species is never so common as the former species. It may be found in about the same localities.

131. **Lophodytes cucullatus.** HOODED MERGANSER.—Winter resident. (Oct.-April 1). In migration, common; in winter, not uncommon. A few remain through the winter in same localities as American Merganser. One should see from one to a dozen on almost any day in winter and early spring along the Platte River between Hardin and Fort Morgan.

132. *Anas platyrhynchos*. MALLARD.—Resident. In summer, common; in migration, abundant; in winter common locally. A common breeder along the Barr Lake Chain. A goodly number of this species remain all winter about the lakes with some open water and along the South Platte River. Common on Barr Lake and Upper Barr Lake in winter.

134a. *Anas fulvigula maculosa*. MOTTLED DUCK.—Migrant; rare. (March 15-?; Oct. 10-about Dec. 10.) Cooke refers to but three specimens; one of which was taken by Wm. Osburn near Loveland, and the other was reported by H. G. Smith as presumably coming from Colorado. Aside from these, one was killed in the fall of 1895 by Vic. Kennicott at Kennicott Club Lake, 3½ miles east of Longmont, and I have one killed just prior to Nov. 13, 1904, near Loveland. C. A. Kendrick says that they are rare about the lakes on which he shoots near LaSalle, Weld County, but that one is occasionally taken there.

135. *Chaulelasmus streperus*. GADWALL.—Resident. In summer, common; in winter, not uncommon; in migration, abundant. Common breeder along the Barr Lake Chain.

137. *Mareca americana*. BALDPATE.—Resident. In summer, not common; in winter, not uncommon; in migration, abundant. Only a few pairs breed along the Barr Lake Chain.

139. *Nettion carolinensis*. GREEN-WINGED TEAL.—Resident. In summer, not uncommon; in winter, not uncommon; in migration, abundant. Breeds along the Barr Lake Chain, but not in such large numbers as the two following species.

140. *Querquedula discors*. BLUE-WINGED TEAL.—Summer resident. (April 5-Dec. 1.) In summer, common; in migration, abundant. Mr. Durward Luper and Mr. L. B. Meek each shot a Blue-winged Teal on Upper Barr Lake on Dec. 1, 1905. Occasionally a Blue-winged Teal is found straggling along with a flock of Green-wings in its migratory flights, sometimes as early as February and as late as December, but I know of none that has remained during the winter. Have found by June 21 eggs that were nearly ready to hatch and fresh eggs on June 26.

141. *Querquedula cyanoptera*. CINNAMON TEAL.—Summer resident. (March 26-Nov. 1 to 15.) In summer, not uncommon locally, but not as common as the former species; in migration, not uncommon locally. While this species is regularly taken along the Barr Lake Chain, at some of the other lakes in this area it seems to be rare. C. A. Kendrick stated to me during the fall of 1908 that he had not seen one on the club lakes at La Salle for four years. At that place between Nov. 1 and Nov. 15, 1903, he shot two of this species during a hard snow storm and while standing in one foot of snow. La Salle lies only 3 miles east of a north and south line through Barr, so it seems strange that this species should not occur at the former place more frequently, even though it is a western species finding its extreme limit in eastern Colorado. Have found fresh eggs June 13 and eggs advanced in incubation July 27.

142. *Spatula clypeata*. SHOVELLER.— Resident. In summer, common; in winter, uncommon; in migration, abundant. A common breeder along the Barr Lake Chain. Have found eggs advanced in incubation by June 24.

143. *Dafila acuta*. PINTAIL.— Summer resident. (First week in February-middle of November.) In summer, uncommon; in migration, abundant. A few pairs breed regularly along the Barr Lake Chain.

144. *Aix sponsa*. WOOD DUCK.— Migrant; very rare. (?-about May 1; Oct. or Nov.) C. A. Kendrick shot one at La Salle in October or November, 1905. Judge Junius Henderson of Boulder records this species for Boulder County. (Univ. of Colo. Studies, V, 3, p. 234.) The specimens upon which that record is based were two males and one female taken by Messrs. James Cowie and Bert B. Werley, 5½ miles northeast of Boulder at Twin Lake, in the end of October, 1904, and the three were in one flock when taken. I am informed that Mr. P. J. Werley shot another male at the same lake three or four years prior to the taking of these three. Mr. Cooke reports it as having been taken "at Loveland and occasionally on the lakes near Denver." He also states that Mr. E. J. Oslar has one, "that was taken at Littleton about May 1, 1892." (Birds of Colo., pp. 55, 156.) I have notes on several others taken in or near this area but the data thus far received on them are too insufficient to mention here. From these known dates, it seems that it is present in or near this area only during spring and fall migration.

146. *Marila americana*. REDHEAD.— Resident. In summer, common; in winter, rather uncommon; in migration, abundant. Have taken it at Barr in mid-winter. Breeds along the Barr Lake Chain in goodly numbers, more abundantly than the following species.

147. *Marila vallisneria*. CANVAS-BACK.— Resident. In summer, not uncommon; in winter, rather uncommon; in migration, common. A few pairs breed regularly along the Barr Lake Chain. Have found fresh eggs June 20.

148. *Marila marila*. SCAUP DUCK.— Migrant; rare (March 26-April 5). Only two specimens have, to my knowledge, been taken in this area, both by Mr. Bryan Haywood at Calkin's Lake, east of Longmont, and just within Weld County. One was taken March 26, 1904, and is now in the State Historical Society collection; the other was taken April 5, 1902, and is in the writer's collection. There seems to have been none recorded from the surrounding territory.

149. *Marila affinis*. LESSER SCAUP DUCK.— Resident. In summer, not uncommon; in winter, rather uncommon; in migration, abundant. A few pairs breed along the Barr Lake Chain.

150. *Marila collaris*. RING-NECKED DUCK.— Migrant; rare. (March 29-about April 25.) There are but few records for the entire State on this species and in the territory near-by this area I know of but two specimens having been taken. For this area itself, I have only one record, a male in my collection, killed by Bryan Haywood at Calkin's Lake, Mar. 29, 1903.

151. *Clangula clangula americana*. AMERICAN GOLDEN-EYE.— Resident. In summer, not common; in winter, common; in migration more common. A dozen or more of this species have been known to remain all summer along the Barr Lake Chain, and for this reason I have called it a resident, although I have never actually found its nest. There are no hollow trees or stumps along this chain of lakes for them to nest in. I have found other ducks' nests in excavations that the ducks themselves had made in musk-rat houses. Following its natural inclinations for hollowed-out nesting sites, this duck may do the same.

152. *Clangula islandica*. BARROW'S GOLDEN-EYE.— Winter resident. (Nov. 18-?.) In migration, not common; in winter, not uncommon. Not known to breed.

153. *Charitonetta albeola*. BUFFLE-HEAD.— Winter resident. (Oct. 24-April 25.) In migration, common; in winter, not uncommon.

154. *Harelda hyemalis*. OLD-SQUAW.— Winter resident. (Oct. 16-about March 1.) In migration and winter, rare. Cooke mentions but six specimens for Colorado, all taken in or near this area. They are: one found dead by G. F. Breninger on the shore of a lake near Fort Collins; two shot by J. B. Sibley on McKay Lake, near Denver, Nov. 13, 1892; two shot by Bryan Haywood at Calkin's Lake, near Longmont, and in Weld County, Oct. 16, 1898; and another shot by Mr. Haywood at the same place on Oct. 23. (Birds of Colo., pp. 57, 195.) H. G. Smith records one other, shot by Judge Park at Longmont, about Nov. 20, 1903. (Auk, XXV, 1908, p. 185). I have a number of other specimens to here record: One, received in the flesh to mount by J. C. Miles, a Denver taxidermist, on Nov. 12, 1903, was shot by D. I. Simmons, about 10 miles down the Platte River from Denver; another was shot by Adolph Siebolt, who gave me the note, during the first or second week in November, 1904, at Lock's Lake, one of the Barr Lake Chain; another received in the flesh by J. C. Miles, Dec. 30, 1904, was shot by Mart Watrus at Kennicott Club Lake, 3½ miles east of Longmont; another received in the flesh to mount by Hugo Todenwarth, on Dec. 4, 1905, was shot by Paul Ireland, presumably near Denver; another was shot by Mart Watrus, my informant, at Kennicott Club Lake in the latter part of February or first part of March, 1906. It thus appears that seven out of the total of twelve specimens reported for Colorado were taken within this area.

[160. *Somateria dresseri*. AMERICAN EIDER.— Migrant; very rare in adjoining locality. Cooke records one taken by W. G. Smith at Loveland some time previous to 1892. (Birds of Colo., p. 156.) He also states that "there is a mounted bird of this species at the rooms of the Society of Natural History in Denver...presumably taken in Colorado nearly twenty years ago." The bird herein referred to does not appear to be a *dresseri*; in fact, Mr. Rudolph Borchardt, who mounted it, and from whom the Natural History Society purchased it, informed me that he imported this skin, along with a lot of other skins, from Germany.]

[163. *Oidemia americana*. AMERICAN SCOTER.— Migrant; rare in

adjoining localities. (About Oct. 2-?.) Cooke records only two for Colorado, one in Mrs. Maxwell's collection, taken presumably near Boulder, and one found dead near Fort Collins by G. F. Breninger. (Birds of Colo., p. 57.) Mr. Adam Balmer informed me that one was taken at Aurora Lake, Aurora, a suburb of Denver, about October 2, 1901.]

165. *Oidemia deglandi*. WHITE-WINGED SCOTER.— Migrant; rare. (Oct. 11-Nov. 3.) Cooke records four specimens for Colorado; three reported by G. F. Breninger, one of which was taken Nov. 3, 1890; and one reported by Mr. Fenton as having been taken at Barr Lake, Nov. 2, 1898. (Birds of Colo., pp. 57, 195.) H. G. Smith records five specimens, as follows: one at Marston's Lake, near Littleton, October, 1887; One at Lee's Lake, near Fort Collins, Oct. 23, 1888; one in the collection of W. G. Smith, Loveland; one at Sloan's Lake, near Denver; and one taken at La Salle, Oct. 24, 1904. (Nid., III, 1896, p. 48, and Auk, XXV, 1908, p. 184.) Dr. W. H. Bergtold records one taken at Loveland, Oct. 11, 1903. (Auk, XXI, 1904, p. 78.) I have in my collection another of this species that was killed by Bryan Haywood at Calkin's Lake, near Longmont, and in Weld County, Oct. 20, 1901.

166. *Oidemia perspicillata*. SURF SCOTER.— Migrant; rare. (October-?.) Cooke records five specimens for Colorado; one in the collection of W. G. Smith, taken at Loveland; one reported by H. G. Smith, taken at Marston's Lake, near Denver, in October, 1887; two killed by H. A. Flynn at Loveland, Oct. 31, 1899; and one killed at Barr Lake by L. B. Meek, Oct. 22, 1889. (Birds of Colo., pp. 57, 196.)

167. *Erismatura jamaicensis*. RUDDY DUCK.— Summer resident. (March 24-?.) In summer, common; in migration, more common. A common and regular breeder along the Barr Lake Chain.


169. *Chen hyperborea*. LESSER SNOW GOOSE.— Winter resident. (Oct. 20-March 14.) Not common in migration or winter. A mounted specimen in the Colorado Museum of Natural History, at City Park, Denver, was shot by J. T. Mason at Barr. Miss Jennie Patten reports to Judge Henderson that on Mar. 14, 1905, she saw a flock of thirty at Yuma.

169a. *Chen hyperborea nivalis*. GREATER SNOW GOOSE.— Migrant; rare. (?-April 9.) Cooke records but two specimens for Colorado; one taken within this area east of Greeley by Pres. Z. X. Snyder, on Mar. 20, 1895; the other taken by John F. Campion at Boyd's Lake near Loveland, on April 9, 1899.

170. *Chen rossi*. ROSS'S SNOW GOOSE.— Winter resident; very rare. (Dec. 23, only date.) The only record for Colorado was a specimen reported by the writer as having been shot by Capt. Eli, U. S. A., and presented by him to Mart H. Watrus who in turn presented it to the Colorado Museum of Natural History. It was taken on Dec. 23, 1906, at Kennicott Club Lake, 3½ miles east of Longmont, and was at the time associating with a flock of Mallards. (Auk, XXIV, 1907, p. 211.)

171a. *Anser albifrons gambeli*. AMERICAN WHITE-FRONTED GOOSE.— Migrant; rare. (March 24 only date known.) There is but one record

for this area known to the writer, a specimen observed by him on March 24, 1903, on the South Platte River a few miles above Masters, Weld County. On the following day Mr. Adam Balmer, in company with the writer, shot this same lone bird, and the identity was thereby rendered positive.

172. ***Branta canadensis***. CANADA GOOSE.—Winter resident. (Oct.-April.) In migration, common; in winter, common locally. Scattered flocks may be found during the winter about the large lakes and along the Platte River. Beyond this area down the Platte they are at times abundant, and it is to that section that the hunters of Denver so frequently go in special quest of geese. Cooke records this species as breeding in 1897 at an altitude of 5500 feet, 5 miles west of Ni Wot, Boulder County, which point is 7-8 miles west of this area. It seems probable from this record that the species will some day be found as a breeder in this area. 

172a. ***Branta canadensis hutchinsi***. HUTCHIN'S GOOSE.—Migrant; not uncommon. (?-April 10.) It seems as if this bird should be found to be also a winter resident, but I have, to date, no record for this season.

[172c. ***Branta canadensis minima***. CACKLING GOOSE.—Migrant; very rare in adjoining area. (?-April 10.) Cooke records but one specimen for Colorado, a bird which was shot by Mr. John F. Campion at Loveland, April 10, 1898, and is now in the collection of the State Historical and Natural History Society. (Birds of Colo., p. 196.)

180. ***Olor columbianus***. WHISTLING SWAN.—Migrant; not common. (About Feb. 5-March 16; latter part of October-?) Mr. Chas. Johnson informs me that Luke Wallick shot a swan at Barr in the spring of 1907. J. C. Miles informs me that he mounted it. C. A. Kendrick shot one at La Salle in the latter part of October, 1906. These were both presumed to be the Whistling Swan, but the writer saw neither of them. These swans are never common, yet it is expected that each season a few will be seen and one or more taken in or near this area.

181. ***Olor buccinator***. TRUMPETER SWAN.—Migrant; rare. (Spring; fall.) Cooke reports one that was shot adjacent to this area, near Fort Collins, in the fall of 1896. (Birds of Colo., p. 59.) There is a mounted specimen in the Colorado Museum of Natural History that was killed at Eaton, Weld County.

184. ***Guara alba***. WHITE IBIS.—Migrant; very rare. The only Colorado record is reported from this area by H. G. Smith, who states that one was shot at Barr Lake in 1890. (Nid., III, 1896, p. 65.)

187. ***Plegadis guarauna***. WHITE-FACED GLOSSY IBIS.—Migrant; rare. (Latter part of March-?; ?-Oct. 3.) H. G. Smith mentions three from Marston's Lake, near Denver. (Nid., III, 1896, p. 65.) Cooke speaks of one in the Maxwell collection at Boulder, and another in W. G. Smith's collection at Loveland. He also states that two specimens were shot at Barr Lake, Oct. 3, 1898. (Birds of Colo., pp. 60, 177.) Two more records may be added: Hugo Todenwarth received to mount a specimen that was shot near Denver in the spring of 1904, the same being examined by the writer; Adolph Siebolt says that in the latter part of March, 1903,

he shot one during a hard snow-storm on Lock's Lake, one of the Barr Lake Chain.

[188. *Mycteria americana*. WOOD IBIS.—Migrant; rare in near-by areas. (?-Aug. 30.) A southern species wandering into Colorado occasionally in summer. Cooke speaks of one in the Maxwell collection at Boulder. (Birds of Colo., p. 60.) The writer recorded two more specimens that were shot by L. L. Llewellyn, Aug. 30, 1902, at a small lake about 12 miles south-west of Denver. (Auk, XX, 1903, p. 65.) Mr. George Suess informs me that in about 1896 or 1897 he saw a flock of perhaps a dozen birds, which appear to have been of this species, at Patrick's Lake, near Littleton.]

190. *Botaurus lentiginosus*. AMERICAN BITTERN.—Summer resident; or resident. In summer, common; in December, rare; in migration, common. I speak of it as a possible resident on the strength of one record, a specimen seen by myself Dec. 28, 1904, at one of the warm springs on the Platte River near Fort Morgan. It appeared to be perfectly sound, being a strong flyer. I have eggs collected June 21, that were but slightly incubated.

[191. *Ixobrychus exilis*. LEAST BITTERN.—Migrant, or summer resident; very rare in near-by localities. (June 8, only known date.) Cooke records but six specimens for Colorado and two of these are from Denver and vicinity, the one being reported by H. G. Smith, and the other having been killed by Rudolph Borchardt, at Berkeley Lake, June 8, 1898. (Birds of Colo., pp. 157, 197.)]

194. *Ardea herodias*. GREAT BLUE HERON.—Summer resident. (March 20-about Sept. 24.) In migration, abundant; in summer, abundant, locally. Abundant in summer along the Barr Lake Chain, to which many are accustomed to fly in from the Platte River in the early morning to feed upon fishes, etc., flying back again to roost presumably in the river timber at night. They appear here in flocks containing as high as two hundred birds. So far as known, they breed in this area only in trees. A number of their heronries have been found within this area, among them being one on the Cache la Poudre River near Windsor, Weld County; one on Crow Creek, northeast of Greeley (Markham, Univ. Colo. Studies, Vol. IV, p. 155 and plate ii, fig. 2.); and two noted several years ago by the writer, the one on the Platte River near Henderson, the other on the same river near Masters. Whether these last two heronries are still used by the herons, I cannot state.

197. *Egretta candidissima*. SNOWY EGRET.—Migrant; not rare. (April 3-Sept., Salida.) A southern species that comes into Colorado in summer regularly in small numbers and strings northward as far as Buffalo, Wyoming, where, I have been told, a specimen was shot by James Dowlin about April 11, 1904. The most northerly record within this area that I have comes from La Salle, where C. A. Kendrick reports that two or three have been shot on their club lakes. I have, aside from the two or three mentioned above as being reported by Mr. Kendrick, twenty-six additional records of this species for the State, ranging from the plains to

Salida (7038 feet), in Chaffee County, where ten were observed, seven being in one flock, and from an east and west line through that point northward nearly across the State. The most of these, aside from the ten at Salida, are from Denver and vicinity northward. The flock of seven at Salida was observed and reported by Mr. B. G. Voigt, deceased, and the other three were received by him to mount, one of them having been taken in the month of September. Not known to breed in Colorado.

[198. *Dichromanassa rufescens*. REDDISH EGRET.—Migrant; very rare in near-by area. Mr. Cooke's second record for Colorado was reported by E. L. Berthoud, "who shot one near Golden about eight years ago" (1890). (Birds of Colo., p. 157.)]

202. *Nycticorax nycticorax naevius*. BLACK-CROWNED NIGHT HERON.—Summer resident. (March 31, or April 1-Dec. 20-24.) In summer, abundant locally; in migration, abundant. H. G. Smith reports a bird uninjured and in good condition as having been shot from a tree between December 20 and 24, 1902, near Fort Lupton, Weld County, by T. L. Monson. (Auk, XXV, 1908, p. 185.) Though this is a winter date, it does not seem probable that this species, owing to its particular habits, will ever be found here as a resident all through the winter. Breeds abundantly along the Barr Lake Chain in low trees, on masses of bent-over cattails and rushes, and on the ground. Flocks of from twenty-five to two hundred may be seen all during the summer along this Chain.

[203. *Nyctanassa violacea*. YELLOW-CROWNED NIGHT HERON.—Migrant, very rare to the State, the only record noted by Cooke being a specimen in the Maxwell collection at Boulder. (Birds of Colo., p. 62.)]

[204. *Grus americana*. WHOOPING CRANE.—Migrant; rare in adjoining areas. (First half of April-?) Cooke mentions one noted by W. G. Smith at Loveland, and one in the museum of the State Agricultural College at Fort Collins. (Birds of Colo., p. 62.)]

[205. *Grus canadensis*. LITTLE BROWN CRANE.—Migrant; rare in near-by areas. (March-?) Cooke mentions a specimen as being in the museum of the State Agricultural College at Fort Collins, and also a specimen mounted by A. T. Allen that was shot several years prior to 1900. (Birds of Colo., pp. 62, 198.) There is a mounted specimen in the State Historical and Natural History Society that was shot by A. T. Allen at Boulder, in March, 1901.]

206. *Grus mexicana*. SANDHILL CRANE.—Migrant; uncommon (April 1-?; Oct. 10-about Oct. 25.) C. A. Kendrick states that about Oct. 25, 1908, he shot one at La Salle, Weld County. He also says that they see, at their club lakes at La Salle, about one flock during each year. On April 1, 1904, the writer saw what he took to be a flock of five of this species at the Barr Lake Chain.

212. *Rallus virginianus*. VIRGINIA RAIL.—Summer resident, or resident. In summer, common; in migration, more common. I mention it as a possible winter resident wholly on the strength of a statement to me by Mr. Fred Granville that he shot one of this species at Ralhouse

Lake, near Denver, on Jan. 13, 1906, near open water. A common breeder along the Barr Lake Chain. Have found eggs as late as June 20 that were not much incubated.

214. *Porzana carolina*. SORA.—Summer resident; common (April-Oct. 13.) A common breeder along the Barr Lake Chain, where I have found fresh eggs as early as May 28 and as late as June 13.

[216. *Creciscus jamaicensis*. BLACK RAIL.—Migrant; very rare in near-by area. (May-?.) But one record for Colorado referred to by Cooke as having been taken at Denver by Mr. David Bruce in May. (Birds of Colo., p. 158.)]

[219. *Gallinula galeata*. FLORIDA GALLINULE.—Migrant; very rare in near-by area. Cooke records one seen by E. L. Berthoud at Lathrop's Lake, 12 miles from Golden. (Birds of Colo., p. 158.)]

221. *Fulica americana*. AMERICAN COOT.—Summer resident. (Middle of March-Oct. 11) Abundant in both migration and summer, breeding abundantly along the Barr Lake Chain. I have found that by the 19th of May practically all the eggs are partially incubated and that some are nearly ready to hatch.

223. *Lobipes lobatus*. NORTHERN PHALAROPE.—Migrant; not uncommon. (May 18; Sept. 8.) Occurs regularly along the Barr Lake Chain.

224. *Steganopus tricolor*. WILSON'S PHALAROPE.—Summer resident; common. (May 3-?.) A regular breeder along the Barr Lake Chain, where flocks of from twenty-five to fifty females may be seen during the breeding season. I have found eggs advanced in incubation by May 28, and others on May 30 in which incubation had not yet begun.

225. *Recurvirostra americana*. AMERICAN AVOCET.—Summer resident; common. (April 8-Oct. 10.) A regular breeder all along the Barr Lake Chain where from one to half a dozen pairs may be seen in the more suitable breeding localities.

226. *Himantopus mexicanus*. BLACK-NECKED STILT.—Summer resident, probably; rare. (April-Nov. 5.) This bird is not often reported this side of the range. There is in the collection of the State Historical and Natural History Society a mounted specimen which was shot near Fort Logan in April, 1899. Judge Junius Henderson saw a bird, which he was very sure was of this species, at Windsor, Weld County, on Nov. 5, 1903.

228. *Philohela minor*. AMERICAN WOODCOCK.—Summer resident, probably; rare. (May 24-Oct.) Only a few records have been made in the State on this species, and of these the bulk come from in or near this area. H. G. Smith reports one on Aug. 12, 1885, and one in October, 1885, both from almost within the city limits of Denver. He also reports one from near Boulder for the fall of 1887, and one from near Fort Lupton, Weld County. (Auk, III, 1886, p. 284, and Nid., III, 1896, p. 65.) Cooke

records one that Dr. W. H. Bergtold saw in Denver in June, 1895; also a pair with three young found July 3, 1897, at Timnath, Larimer County, some two or three miles west of this area. (Birds of Colo., pp. 64, 158.) Judge Junius Henderson writes that on May 24 and also on May 30, 1904, he saw one of this species, presumably the same bird, one mile east of Boulder.

230. *Gallinago delicata*. WILSON'S SNIPE.— Winter resident. (Sept. 26-about May 1.) In migration, common; in winter, rather rare except in certain localities, such as the vicinity of warm springs along the Platte River, where one may expect to see a few of them all through the winter.

232. *Macrorhamphus scolopaceus*. LONG-BILLED DOWITCHER.— Migrant; not uncommon. (Last week in April-?; July 24-Sept. 30.) Mr. H. W. Henshaw's capture, near Denver, of a bird of this species on July 24, 1873, makes one wonder whether it may not be some day found breeding here. My own latest spring record is May 13.

233. *Micropalama himantopus*. STILT SANDPIPER.— Migrant; not common. (May-early June; latter part of July-Sept. 30.) I do not believe this bird to be as rare as appears from previous reports. It occurs regularly in small numbers along the Barr Lake Chain and I would not expect a season of systematic note-taking there to pass without seeing a few of them, or possibly several small flocks. It starts south early, in the latter part of July, and from my experience it is more common in fall than in spring migration.

239. *Pisobia maculata*. PECTORAL SANDPIPER.— Migrant; common. (First part of May-first part of June; latter part of July-Oct. 7.) Begins to return early, along with other species of sandpipers, in latter part of July.

[240. *Pisobia fuscicollis*. WHITE-RUMPED SANDPIPER.— Migrant; rare in adjoining area. Cooke states that it is "not uncommon" in the State, "finding its western limit at the base of the Rockies," and "reported by Osburn," presumably from Loveland. (Birds of Colo., p. 55.)]

241. *Pisobia bairdi*. BAIRD'S SANDPIPER.— Migrant, or summer resident. (April-Oct. 3.) The most abundant of our sandpipers and especially numerous during the late summer and fall. I have found them in the middle of June and through July in flocks ranging from twenty-five in the middle of June to two hundred or more by the end of the first week in July. The most of these flocks are wild and restless, as birds will be in migratory flight, flushing at 100-150 yards, swishing round and round, then many times towering high into the air and striking out to the south or southeast. Many of the members of these early flocks appear to be young. Some during these early summer periods are found also in ones, or twos, and while it is, I think, not known to breed this far south, these data force one to question whether it does not breed here or in the near-by mountains. This is my only excuse for adding, "or summer resident" after "migrant."

242. *Pisobia minutilla*. LEAST SANDPIPER.— Migrant, or summer

resident. (Latter part of April-Sept. 30.) In migration, very common; in summer, not uncommon. This is another perplexing little fellow, but I am emboldened to label it "or summer resident" with, perhaps a little more reason than in the case of Baird's Sandpiper, for in this case my notes indicate his presence during the entire summer and in June only in singles, or twos, or very small groups and not in flocks the size of those of *bairdi*.

[243a. *Pelidna alpina sakhalina*. RED-BACKED SANDPIPER.— Migrant; rare in adjacent localities. (April 29-June 1.) Cooke reports three specimens for Colorado, all from territory adjacent to this area; viz., one in the Maxwell collection at Boulder and two taken by W. G. Smith at Loveland, April 29 and May 9. (Birds of Colo., p. 66.)]

246. *Ereunetes pusillus*. SEMIPALMATED SANDPIPER.— Migrant; rather rare. (Last of April-May 24.) Cooke speaks of this species as "not uncommon . . . mostly on the plains and below 7000 feet." (Birds of Colo., p. 66.) In this particular area it is one of the rarer of the sandpipers.

[247. *Ereunetes mauri*. WESTERN SANDPIPER.— Migrant; rare in adjoining localities. (May 9-May 12; July 4-?). Cooke gives but four records, three of which are from territory adjoining this area: viz., one taken at Loveland by Prof. Wm. Osburn on July 4, 1899, and another on May 12, 1890; one taken at Loveland by W. G. Smith on May 9, 1890. (Birds of Colo., p. 66.)]

248. *Calidris leucophæa*. SANDERLING.— Migrant; rare in this and surrounding territory, being found only occasionally in spring and fall migration. This is a typical bird of the sea-shores, where it is abundant in migrations. During these periods it is, however, nearly cosmopolitan, being found on the larger bodies of water in the whole interior, and I believe that a more systematic search on our larger lakes will reveal them in greater numbers here.

249. *Limosa fedoa*. MARBLED GODWIT.— Migrant; not common. (May 3-?). While this bird is never common, I expect to see a few along the Barr Lake Chain every season, especially in the spring. I have no breeding records for this area, but it will not be surprising if it is found to breed here.

254. *Totanus melanoleucus*. GREATER YELLOW-LEGS.— Migrant or summer resident. (March 29-Oct. 29.) In migration, common, but not nearly so common as the Lesser Yellow-legs, the flocks of the former usually consisting of from five to fifty or sixty birds, while those of the latter consist of as high as several hundred birds. I have noted this species during every month from March to October, and, though I have no records of nests within this area, I believe it will yet be found breeding here.

255. *Totanus flavipes*. YELLOW-LEGS.— Migrant or summer resident. (April-October.) This species is found at about the same time and in about the same localities as the previous species and I believe that this bird will also some day be found breeding here.

256. *Helodramus solitarius*. SOLITARY SANDPIPER.— Migrant; rather uncommon. (?-May 9; Aug. 20-Sept. 25.) Not known to breed.

258a. *Catoptrophorus semipalmata inornata*. WESTERN WILLET.— Migrant or summer resident. (April-Sept. 5.) I have notes on this species covering the most of the summer and believe it will yet be found breeding here.

261. *Bartramia longicauda*. BARTRAMIAN SANDPIPER.— Summer resident. (Latter part of April-Aug. 23.) In summer common locally. I have never found this species to be what I would call abundant at any time of the year in Colorado. I have not seen many of them along the Barr Lake Chain, and in other localities I have found them in flocking time in not large numbers.

263. *Actitis macularia*. SPOTTED SANDPIPER.— Summer resident. (Third week in March-Sept. 21.) In summer, common; in migration, very common. Cooke says, "a few remain until far into the winter, if not through the winter."

264. *Numenius americanus*. LONG-BILLED CURLEW.— Summer resident. (March 31-Oct. 22.) A common bird on the plains in suitable localities. Common along the Barr Lake Chain.

[265. *Numenius hudsonicus*. HUDSONIAN CURLEW.— Migrant; rare in near-by areas. (About May 1-?.) Cooke says, "All the records of this Curlew in Colorado come from the plains region east of the mountains." (Birds of Colo., p. 67.) Upon this statement alone, it is placed here in the hypothetical list.]

270. *Squatarola squatarola*. BLACK-BELLIED PLOVER.— Migrant; not uncommon locally. (Last week of March-latter part of May; Sept. 12-Oct. 22.) They are present along the Barr Lake Chain at some time during perhaps every migrating season, in numbers varying from one to twenty-five or more.

272. *Charadrius dominicus*. AMERICAN GOLDEN PLOVER.— Migrant; uncommon. (Last week in March-?.) This species is only occasionally seen along the Barr Lake Chain, it being not nearly so common, as far as my experience goes, as the Black-bellied Plover.

273. *Oxyechus vociferus*. KILLDEER.— Summer resident or resident. (Feb. 3-Dec. 31.) In summer and migration, abundant; in December and February, rare. I can all but call it with certainty a resident, since I have never noted it in January, but I am still hopeful of finding it all through the winter about the warm springs down the Platte River, or at open water elsewhere.

274. *Aegialitis semipalmata*. SEMIPALMATED PLOVER.— Migrant; rare. Although found in migration over the whole of North America this is the rarest of our plovers. It stops here only occasionally in its migratory flight between its breeding grounds in the far North and its winter home in Middle and South America.

281. *Podasocys montanus*. MOUNTAIN PLOVER.— Summer resident; common. (March 23-Oct. 12.) A common breeder on the plains. Have found eggs to be advanced in incubation as early as May 14, and young about a day out of the egg on June 23.

[283. *Arenaria interpres*. TURNSTONE.—Migrant; rare in near-by localities (about April 26-May 18.) H. G. Smith records one taken at Sloan's Lake, near Denver, on April 26, 1890 (Nid., III, 1896, p. 65), and Cooke records eight seen at Berkeley Lake, near Denver, on May 18, 1900. (Birds of Colo., p. 201.)]

AN INSTANCE OF HYBRIDIZATION IN HUMMING-
BIRDS, WITH REMARKS ON THE WEIGHT OF
GENERIC CHARACTERS IN THE
TROCHILIDÆ.

BY WALTER P. TAYLOR.¹

WHILE collecting in the vicinity of Nicasio, Marin County, for the Museum of Vertebrate Zoölogy on February 26, 1909, I shot a small hummingbird which I took to be *Selasphorus alleni*. My attention has been called to the fact, however, that it is a hybrid, probably the result of a cross between *Selasphorus alleni* and *Calypte anna*. According to Ridgway, it was with little doubt such a hybrid upon which Gould based his description of *Selasphorus floresii* (Mon. Troch., pt. xxiii, Sept. 1, 1861, pl. 10; Vol. III, 1861, pl. 139), from a specimen taken at Bolanos, State of Oaxaca, Mexico.

There have been to my knowledge previous to this date three definite records only of the taking of this hybrid. One of these is the type of *Selasphorus "floresii,"* taken at Bolanos. The second is a bird found by Walter E. Bryant in a taxidermist's shop in San Francisco (first recorded in 'Forest and Stream,' XXVI, June, 1886, p. 426). This specimen was "shot by a boy" near San Francisco, and had been mounted to serve as an ornament on a hat. The third record is that of the taking of a male specimen at Haywards, California, by W. Otto Emerson (Condor, III, May, 1901, p. 68). Through the courtesy of the latter I have seen this bird. It is almost identical in coloration and size with the hybrid taken by me at Nicasio, though it resembles *Calypte anna* even more than the Marin County bird.

¹ A Contribution from the University of California Museum of Vertebrate Zoölogy

In addition to these definite records Bendire mentions "*floresii*" as having been recorded from Jalisco, Mexico (Life Histories, II, 1895, p. 209); but he does not say upon whose authority the record is made, nor does he give any information upon the subject. The present record is, at all events, the third for California.

The bird (No. 7125, Univ. Calif. Mus. Vert. Zool.) is in most characters an intermediate between *Calypte anna* and *Selasphorus allenii* but in general appearance is nearer the former. Like former specimens of "*floresii*" it has the gorget and crown "glowing metallic rose-red." The brilliant crown is not so extensive as in *Calypte anna*, however, and there is a decided *Selasphorus*-like golden tinge to all the iridescent gorget and crown feathers. The feathers of breast, belly, and sides resemble *Calypte anna*, but there are some distinct traces of rufous. The breast is whiter than that of the Anna, but not so white as that of the Allen Hummingbird. The feathers of the occiput, nuchal region, back and rump, and the upper tail-coverts are green with narrow edgings of rufous. The first primary is much narrower than in *Calypte anna*, though its end is rounded rather than pointed. The tail is much less deeply emarginate than that of the Anna, which it nevertheless resembles in general shape. All of the rectrices are marked to a greater or less extent with rufous. The color appears to be rather unevenly distributed, some of the feathers having the basal half of their outer webs, and others a part of their inner webs, rufous. The elongated lateral ruff-like extensions of the gorget are similar to those of *Calypte anna* but not so highly developed.

Taking into account the animal kingdom as a whole it is noted that while hybridization between species is as a rule not common (outside of birds, at least) that between genera is extremely rare. Thayer and Bangs have called attention to the proneness of various hummingbirds to hybridize, and list from California alone four cases of the crossing of the so-called distinct genera (Auk, XXIV, July, 1907, p. 313).

In the light of results obtained from experimentation by Whitman, Beebe, and others, it is a question whether feather differences alone are of sufficient morphologic significance to constitute the characters of genera. Apparently the former genus *Trochilus* has been split up into several genera on the basis of characters of specific importance only.

A moment's consideration is sufficient to convince one that both in separating the genera *Trochilus*, *Selasphorus* and *Calypte*, and in distinguishing between the species within each respective genus, characters of practically equal rank have been used. For example, compare the kind of characters used by Ridgway (Report U. S. Nat. Mus., 1890, p. 340) in diagnosing the genus *Selasphorus*, with those which separate *alleni* from *rufus* within the genus. Feather coloration generally, the form of the outer primary, and the form and coloration of the tail-feathers are perhaps the most important of the "generic" characters. Upon turning to the species descriptions it becomes evident at once that characters of the same importance have been made use of. The clearest distinction between *rufus* and *alleni* apparently consists in a difference in form of tail-feather, *rufus* possessing a notch on the inner web of the next to the middle pair of rectrices which *alleni* does not have. At the same time the "generic" characters of the most weight concern the form of the feathers of tail and wing. It would seemingly be as reasonable to put *Selasphorus alleni* in one genus and *Selasphorus rufus* in another, as to split up *Trochilus* on the basis of characters of no more weight than those separating these two species.

There are differences between *Calypte*, *Selasphorus* and the present *Trochilus* to be sure, but are the differences of such importance that these subdivisions should be accorded generic rank? The relatively frequent occurrence of hybrids would seem to support a negative answer to this question.

So far, there have been recorded from California hybrids of *Calypte anna* + *Trochilus alexandri*, *Calypte anna* + *Selasphorus alleni*, *Trochilus alexandri* + *Calypte costae*, and *Selasphorus rufus* + *Stellula calliope* (Thayer & Bangs, *l. c.*). It will be observed that the Trochiline hybrids occur only between species whose ranges overlap or adjoin, isolation of habitat therefore being perhaps the main reason why other combinations do not appear.

FIFTEENTH SUPPLEMENT TO THE AMERICAN
ORNITHOLOGISTS' UNION CHECK-LIST OF
NORTH AMERICAN BIRDS.

THE Fourteenth Supplement to the Check-List was published in 'The Auk' for July, 1908 (XXV, pp. 343-399). The present Supplement gives the results of the Committee's work at its meetings held in Cambridge, Mass., November 16, 1908, and in Washington, April 13-17, 1909. At the Washington meeting all questions before it relating to the names and status of species, subspecies, and higher groups were disposed of in preparation for the new (third) edition of the Check-List, the manuscript for which is now nearly ready for the press. The present Supplement is therefore the final report of the Committee in relation to the preparation of the new Check-List.

It was finally decided, on the ground of convenience, to retain the order of arrangement of the higher groups (orders, suborders, families, etc.) followed in the former editions of the Check-List, for reasons more fully stated in the Preface to the new edition. It was also found desirable to omit the numeration of the species. It was further decided (in opposition to a former ruling of the Committee) to continue to use the possessive form, as heretofore, in vernacular names based on the names of persons.

The vernacular names employed in the Check-List were carefully scrutinized with a view to their modification in cases where names could be found that are more in accord with those in use where the birds live. A number of popular vernacular names were thus substituted for 'book names.' It was also decided to omit 'American' as a prefix, as being superfluous in a list of North American Birds. On the other hand, European birds, with the same vernacular names as their American representatives, are distinguished by the prefix 'European.'

The Fourteenth Supplement contained a list (*l. c.*, p. 399) of 16 generic cases that had been referred to the Nomenclature Commission of the International Zoölogical Congress for decision. Unfortunately the Committee has been disappointed in its expectation of obtaining a report from the Commission in time to incorporate its decisions in the new edition of the Check-List. In the

first 12 of these cases the names involved are allowed to stand as in the previous editions of the Check-List, with the exception of the case of *Chæmepelia*, which in the present Supplement (below, p. 300) is adopted in place of the untenable name *Columbigallina*. The last four names are the 'Swainsonian genera,' of late under controversy but now accepted in accordance with the law of priority.

The list of 'deferred cases' is now reduced to 12, 11 of which relate to the status of forms that have been described as species or subspecies, and one is a case of nomenclature. In each of these cases the Committee has been unable to secure material for their proper consideration.

Committee.	{	J. A. ALLEN, <i>Chairman</i> .
		CHARLES W. RICHMOND, <i>Secretary</i> .
		WILLIAM BREWSTER.
		JONATHAN DWIGHT, JR.
		C. HART MERRIAM.
		ROBERT RIDGWAY.
		WITMER STONE.

I. ADDITIONS TO THE CHECK-LIST.

133a. **Anas rubripes tristis** BREWSTER.

Black Duck.

Anas rubripes tristis BREWSTER, Auk, XXVI, April, 1909, 176.

197.1. **Egretta candidissima brewsteri** THAYER & BANGS.

Brewster's Snowy Egret.

Egretta candidissima brewsteri THAYER & BANGS, Proc. New Engl. Zool. Club, IV, April 29, 1909, 40.

301b. **Lagopus lagopus alexandræ** J. GRINNELL.

Alexander's Ptarmigan.

Lagopus alexandræ GRINNELL, Univ. Calif. Pub. Zool., V, No. 2, Feb. 18, 1909, 204.

302e. **Lagopus rupestris chamberlaini** CLARK.

Adak Ptarmigan.

Lagopus rupestris chamberlaini CLARK, Proc. U. S. Nat. Mus., XXXII, No. 1539, June 15, 1907, 469.

- 302f. *Lagopus rupestris dixonii* J. GRINNELL.

Dixon's Ptarmigan.

Lagopus dixonii GRINNELL, Univ. Calif. Pub. Zool., V. No. 2,
Feb. 18, 1909, 207.

- 337e. *Buteo borealis alascensis* J. GRINNELL.

Alaska Red-tail.

Buteo borealis alascensis GRINNELL, Univ. Calif. Pub. Zool.,
V, No. 2, Feb. 18, 1909, 211.

SUBFAMILY POLYBORINÆ.

Admitted as a subfamily, to include Nos. 362 and 363.

- 393g. *Dryobates villosus terrænovæ* BATCHELDER.

Newfoundland Woodpecker.

Dryobates villosus terrænovæ BATCHELDER, Proc. New Engl.
Zool. Club, IV, June 24, 1908, 37.

- 581s. *Melospiza melodia maxillaris* J. GRINNELL.

Suisun Song Sparrow.

Melospiza melodia maxillaris GRINNELL, Univ. Calif. Pub.
Zool., V, No. 3, April 9, 1909, 265.

II. ELIMINATIONS.

- [359.1.] *Falco tinnunculus* LINNÆUS. Excluded on the basis
of recent evidence that it was included in the Check-List on
erroneous information.

- 622d. *Lanius ludovicianus mearnsi* RIDGWAY. Considered as
indistinguishable from *L. l. anthonyi*. (Cf. LINTON, Condor,
X, 1908, 182.)

III. CHANGES IN NOMENCLATURE, INCLUDING CHANGES IN STATUS.

- [106.2.] *Oceanodroma castro* (HARCOURT). Brackets to be re-
moved.

GENUS **PAVONCELLA** LEACH. This, being a *nomen nudum*, becomes

GENUS **MACHETES** CUVIER.

Machetes CUVIER, Règne Animal, I, 1817, 490. Type, *Tringa pugnax* LINNÆUS.

No. [260] thus becomes

[260] **Machetes pugnax** (LINNÆUS).

SUBFAMILY **PERDICINÆ**. PARTRIDGES. This becomes

FAMILY **ODONTOPHORIDÆ**. BOB-WHITES, QUAILS, ETC.

SUBFAMILY **TETRAONINÆ**. This becomes

FAMILY **TETRAONIDÆ**. GROUSE, SPRUCE PARTRIDGES, PTARMIGANS, ETC.

FAMILY **PHASIANIDÆ**. This becomes

FAMILY **MELEAGRIDÆ**. TURKEYS.

GENUS **COLUMBIGALLINA** BOIE. Within the limits of the Check-List, this is changed to

GENUS **CHÆMEPELIA** SWAINSON.

Chæmepelia SWAINSON, Zoölogical Journal, III, Dec., 1827, 361.
Type, *Columba passerina* LINNÆUS.

No. 320 and its subspecies require correction as follows:

320. **Chæmepelia passerina terrestris** (CHAPMAN).

320a. **Chæmepelia passerina pallescens** BAIRD.

320b. **Chæmepelia passerina bermudiana** (BANGS & BRADLEE).

SUBFAMILY **ACCIPITRINÆ**. Becomes

FAMILY **BUTEONIDÆ**.

SUBFAMILY **FALCONINÆ**. This becomes

FAMILY **FALCONIDÆ**. To include the subfamilies *Falconinæ* and *Polyborinæ*.

SUBFAMILY **PANDIONINÆ**. This is given family rank, as

FAMILY **PANDIONIDÆ**.

GENUS **GLAUX** MORRIS. This, strictly interpreted, is a *nomen nudum*, and again becomes

GENUS **CRYPTOGLAUX** RICHMOND.

Cryptoglaux RICHMOND, Auk, XVIII, April, 1901, 193. Type, *Strix tengmalmi* GMELIN = *S. funerea* LINNÆUS.

Nos. 371-372a will thus remain as given in the Thirteenth Supplement (Auk, XXI, 1904, 413), with the change of the species name from *tengmalmi* to *funerea*, as given in the Fourteenth Supplement (Auk, XXV, 1908, 371).

GENUS **TROCHILUS** LINNÆUS. This is changed to

GENUS **ARCHILOCHUS** REICHENBACH.

Archilochus REICHENBACH, Journ. für Orn., 1853, Extra-Heft, 1854 (Aufz. der Colib.), 13. Type, *Trochilus alexandri* BOURCIER & MULSANT.

The following changes are necessitated in nos. 428 and 429:

428. **Archilochus colubris** (LINNÆUS).

429. **Archilochus alexandri** (BOURCIER & MULSANT).

GENUS **COTURNICULUS** BONAPARTE. This becomes

GENUS **AMMODRAMUS** SWAINSON.

Ammodramus SWAINSON, Philos. Magazine, n. s., I, June, 1827, 435. Type, *Ammodramus bimaculatus* SWAINSON.

Nos. 545-546b become

545. **Ammodramus bairdi** (AUDUBON).

546. **Ammodramus savannarum australis** MAYNARD.
546a. **Ammodramus savannarum bimaculatus** SWAINSON.
546b. **Ammodramus savannarum floridanus** (MEARNS).

SUBGENUS **AMMODRAMUS** SWAINSON. This is changed to

GENUS **PASSERHERBULUS** MAYNARD.

Passerherbulus MAYNARD, Birds Eastern N. A., 2d ed., Pt. 40,
1895, 707. Type, *Emberiza leconteii* AUDUBON.

Nos. 547-551 thus become

547. **Passerherbulus henslowi** (AUDUBON).
547a. **Passerherbulus henslowi occidentalis** (BREWSTER).
548. **Passerherbulus lecontei** (AUDUBON).
549. **Passerherbulus caudacutus** (GMELIN).
549.1. **Passerherbulus nelsoni** (ALLEN).
549.1a. **Passerherbulus nelsoni subvirgatus** (DWIGHT).
550. **Passerherbulus maritimus** (WILSON).
550a. **Passerherbulus maritimus peninsulæ** (ALLEN).
550b. **Passerherbulus maritimus sennetti** (ALLEN).
550c. **Passerherbulus maritimus fisheri** (CHAPMAN).
550d. **Passerherbulus maritimus macgillivraii** (AUDUBON).
551. **Passerherbulus nigrescens** (RIDGWAY).

GENUS **HELMINTHOPHILA** RIDGWAY. This becomes

GENUS **VERMIVORA** SWAINSON.

Vermivora SWAINSON, Philos. Magazine, n. s., I, June, 1827,
434. Type, *Sylvia solitaria* WILSON = *Certhia pinus*
LINNÆUS.

Nos. 640-647 thus become

640. **Vermivora bachmani** (AUDUBON).
641. **Vermivora pinus** (LINNÆUS).
642. **Vermivora chrysoptera** (LINNÆUS).
643. **Vermivora luciae** (COOPER).

644. *Vermivora virginiae* (BAIRD).
 645. *Vermivora rubricapilla* (WILSON).
 645a. *Vermivora rubricapilla gutturalis* (RIDGWAY).
 646. *Vermivora celata* (SAY).
 646a. *Vermivora celata lutescens* (RIDGWAY).
 646b. *Vermivora celata sordida* (C. H. TOWNSEND).
 647. *Vermivora peregrina* (WILSON).

662. *Dendroica blackburniae* (GMELIN). This is changed to
 662. *Dendroica fusca* (P. L. S. MÜLLER).

Motacilla fusca MÜLLER, Natursyst. Suppl., 1776, 175. (Cf.
 BERLEPSCH, Novit. Zool., XV, 1908, 315.)

This change is made necessary by reason of *Motacilla fusca*
 MÜLLER having priority over *M. blackburniae* GMELIN.

IV. PROPOSED ADDITIONS AND CHANGES NOT ACCEPTED.

*Plautus*¹ vs. *Alca*.

Thalasseus vs. *Hydroprogne*.

Actocheilidon vs. *Thalasseus*.

Fulmarus vs. *Rhantistes*.

Herodias vs. *Leucophoyx*.

Lophortyx catalinensis GRINNELL, Auk, XXIII, 1906, 262. Re-
 considered and again found not entitled to recognition.

Chæmepelia vs. *Columbina*.

Catharista vs. ———?

Urubitinga vs. *Morphnus*.

Speotyto cunicularia becki ROTHSCILD & HARTERT, Nov. Zool.,
 IX, 1902, 405. The Guadeloupe Island form is too slightly
 differentiated to warrant recognition.

Ceryle vs. *Alcedo*.

Picoides americanus fumipectus GRINNELL, Univ. Calif. Pub. Zool.,
 V, 1909, 217. The single known specimen considered as not a
 satisfactory basis for the admission of this form.

Otocoris alpestris enertera OBERHOLSER, Proc. Biol. Soc. Wash.,
 XX, 1907, 41. Regarded as too close to *O. a. pallida*.

¹ In reference to the generic cases here listed see *antea*, p. 295.

Agelaius phoeniceus arctolegus OBERHOLSER, Auk, XXIV, 1907, 332. Not satisfactorily distinguishable.

Loxia curvirostra sitkensis GRINNELL, Univ. Calif. Pub. Zoöl., V, 1909, 223. It was found that the alleged characters appear in birds from various parts of the range of *L. c. minor*.

Acanthis vs. *Ægiothus*.

Zonotrichia vs. *Hortulanus*.

Melospiza melodia saltonis GRINNELL, Univ. Calif. Pub. Zoöl., V, 1909, 268. Not satisfactorily distinguishable from *M. m. fallax*.

Melospiza melodia gouldi, cf. GRINNELL, Univ. Calif. Pub. Zoöl., V, 1909, 267. Regarded as too near *M. m. samuelis*.

Tiaris vs. *Euethia*.

Bombycilla garrula pallidiceps REICHENOW, Orn. Monatsb., XVI, 1908, 191. No appreciable differences could be found between birds from Europe and various parts of the Northwest, when birds comparable as to season, age, and sex were compared.

Vireo huttoni oberholseri BISHOP, Condor, VII, Sept. 1905, 142, 143. Based on a seasonal phase of plumage. (Cf. GRINNELL, Condor, XI, March, 1909, 66.

Helinaia — ?

The following generic names, proposed in Maynard's Directory to the Birds of Eastern North America, 1907, are not accepted:

Caeruleocantor, p. 236. Type, *Motacilla caerulea* GMELIN.

Maculocantor, p. 238. Type, *Motacilla maculosa* GMELIN.

Azuria, p. 238. Type, *Sylvia rara* WILSON.

Sylviocantor, p. 239. Type, *Motacilla pennsylvanica* LINNÆUS.

Lineocantor, p. 240. Type, *Motacilla striata* FORSTER.

Piceocantor, p. 241. Type, *Motacilla blackburniae* GMELIN.

Vireocantor, p. 242. Type, *Motacilla virens* GMELIN.

Agreocantor, p. 243. Type, *Sylvicola kirtlandii* BAIRD.

Pinacantor, p. 244. Type, *Sylvia vigorsii* AUDUBON.

Terracantor, p. 245. Type, *Motacilla palmarum* GMELIN.

Fruticantor, p. 246. Type, *Sylvia discolor* VIEILLLOT.

Fruticantor, p. 251. Type, *Sylvia formosa* WILSON.

Turdus iliaceus vs. *T. philomelos* [BREHM, 1831] (cf. HARTERT, Bull. Brit. Orn. Club, XXXIII, No. cxlviii, Feb. 2, 1909, 54).

Planesticus migratorius caurinus, GRINNELL, Univ. Calif. Pub. Zoöl., V, 1909, 241.

V. DEFERRED CASES.

Acanthopneuste borealis vs. *A. b. kennicottii*.

Accipiter velox rufilatus RIDGWAY.

Anas boschas spilogaster SCHIOLER.

Ardea herodias treganzai COURT.

Bæolophus inornatus murinus RIDGWAY.

Glaucidium phalænoides vs. *G. p. ridgwayi*.

Larus vegæ vs. *L. argentatus*.

Melospiza cinerea phæa FISHER.

Oceanodroma socorroensis vs. *O. monorhis*.

Pinacantor vigorsii florida MAYNARD.

Telmatodytes palustris thryophilus OBERHOLSER.

Totanus melanoleucus frazari BREWSTER.

VI. CHANGES IN VERNACULAR NAMES.

In addition to the list of changes given below it was decided to omit 'American' as a part of the vernacular name, and to add 'European' where necessary. Also to abandon the adjectival form of geographical names, as Bahaman, Californian, Texan, etc., for Bahama, California, Texas, etc., except where the adjectival form is required for euphony, as in Acadian, Cuban, Mexican, etc.; and to substitute Northwestern for Northwest, where such designations occur.

St. Domingo Grebe	becomes Mexican Grebe.
Dark-bodied Shearwater	" Sooty Shearwater.
Stormy Petrel	" Storm Petrel.
Tropic Bird	" Tropic-bird.
Anhinga	" Water-Turkey.
Man-o'-War Bird	" Man-o'-war-bird.
Widgeon	" European Widgeon.
Steller's Duck	" Steller's Eider.
Lesser Snow Goose	" Snow Goose.
Ross's Snow Goose	" Ross's Goose.
White-bellied Brant	" Brant.
Whooping Swan	" Whooper Swan.

European Blue Heron	becomes European Heron.
Snowy Heron	" Snowy Egret.
Greater Snipe	" Great Snipe.
Bartramian Sandpiper	" Upland Plover.
Ring Plover	" Ringed Plover.
Little Ring Plover	" Little Ringed Plover.
Surf-Bird	" Surf-bird.
Partridge	" Quail, in Nos. 292-296.
Canada Grouse	" Spruce Partridge.
Prairie Hen	" Prairie Chicken.
Sage Grouse	" Sage Hen.
Florida Wild Turkey	" Florida Turkey.
Black Merlin	" Black Pigeon Hawk.
Richardson's Merlin	" Richardson's Pigeon Hawk.
Green-crested Flycatcher	" Acadian Flycatcher.
American Raven (No. 486)	" Western Raven.
Bicolored Blackbird	" Bicolored Red-wing.
Tricolored Blackbird	" Tricolored Red-wing.
House Finch	" California Linnet.
Leucosticte (Nos. 523-526)	" Rosy Finch.
Snowflake (Nos. 534-535)	" Snow Bunting.
Sandwich Sparrow	" Aleutian Savannah Sparrow.
Savanna ¹ Sparrow	" Savannah Sparrow.
Bryant's Marsh Sparrow	" Bryant's Sparrow.
Belding's Marsh Sparrow	" Belding's Sparrow.
Townsend's Sparrow	" Townsend's Fox Sparrow, and the word 'Fox' is added in the names of all the sub- species of No. 585.
Louisiana Tanager	" Western Tanager.
Parkman's Wren	" Western House Wren.
Turner's Chickadee	" Yukon Chickadee.
Wilson's Thrush	" Veery.

The word 'Bewick's' is to be omitted from all the subspecies under No. 719, except the first.

Ridgway's vernacular names, in 'Birds of North and Middle America,' are adopted for the species and subspecies of *Chamaea*.

'Macgillivray's Warbler' is *not* changed to 'Tolmie's Warbler.'

¹ Named from the city of Savannah.

GENERAL NOTES.

Additional Record of the European Widgeon (*Mareca penelope*).— I am indebted to Judge Lewis Rinaker of Chicago, for the opportunity of recording the capture of another specimen of this rare visitor. While duck-shooting on Snackwine Lake, Putnam Co., Illinois, April 13, 1909, Judge Rinaker shot a male of this species from a pair which came to his decoys. Whether his mate was of English or American descent, could not be determined. The specimen is now the property of Mr. Richard A. Turtle of Chicago. This record makes the twenty-first for the interior.— RUTHVEN DEANE, *Chicago, Ill.*

Capture of the European Widgeon in New Hampshire.— I received on Nov. 17, 1908, from Peabrook, N. H., a young male European Widgeon (*Mareca penelope*). This bird was taken in company with a flock of Black Ducks by a market gunner in that locality. I intend to present it to the Boston Society of Natural History.— JOHN H. HARDY, JR., *Arlington, Mass.*

The Lesser Snow Goose (*Chen hyperborea nivalis*) in Gorham, Maine.— During the week of November 16 to 21, 1908, one of these birds was shot by a fox hunter in a field in Gorham, Maine. The bird was much emaciated and in the immature plumage in which it is usually seen in Maine. It was mounted by, and is in the possession of, Mr. Leonard Leighton, of Westbrook, where I made an examination of it.— ARTHUR H. NORTON, *Portland, Me.*

A Second Record for the Fulvous Tree-duck taken in Missouri.— Through the kindness of Mr. Wm. L. Evers of Quincy, Ill., I am enabled to report the capture of a second specimen of the Fulvous Tree-duck, *Dendrocygna fulva*, for Missouri. This bird, a male, was shot by Mr. Evers, April 29, 1909, on the prairie of Lewis County, Mo., about latitude 40°, and just across the Mississippi River from Quincy. Mr. Evers kindly gave me the following particulars: "When the bird came over me, I, at first, thought it was a large Curlew. The flight was sailing like that of a hawk, and its note a peculiar whistle. It was alone and from the noise it was making seemed to be lost. It was in perfect physical condition and made a fine specimen for my collection. The identification was corroborated by Mr. Otho C. Poling of Quincy, formerly an ardent ornithologist, now chiefly engaged in the scientific study of lepidoptera." April 29 was the hottest day of the month in Missouri with an official temperature of 8° at Hannibal (near Quincy). A very low barometer of 29.25 covered northern Missouri, attended by a hard gale from the south over the entire area from southern Texas northward, with maximum temperatures of 102° at Del Rio, 98° at San Antonio, and 96° at Fort Worth.— O. WIDMANN, *St. Louis, Mo.*

Third Record of the Purple Gallinule (*Ionornis martinica*) in Illinois.—

I am indebted to Mr. W. A. Powers of Wilington, Ill., for information regarding the capture of a specimen of this species, which is rare for this State. The bird was killed by Mr. Powers while snipe-shooting near Wilington, Will Co., Ill., on April 26, 1909. It is mounted and now in his possession. The two previous records for the State are recorded in 'The Auk,' Vol. XIX, 1902, p. 77.—RUTHVEN DEANE, *Chicago, Ill.*

Wilson's Snipe wintering in Pennsylvania.—

While out collecting on January 27, 1909, my friend, Mr. Foster White, obtained a fine specimen of the Wilson's Snipe (*Gallinago delicata*) in a small swampy area near State College, Center County, Pennsylvania. The rarity of the species at this season in Pennsylvania is at once apparent, and in Center County its occurrence is astonishing, as the whole valley in which State College lies is some twelve hundred feet above the level of the sea. Previous to the capture of this bird, I had observed specimens lingering in the same swamp as late as December 5, and again on the 12th, of the year 1908.—RICHARD C. HARLOW, *State College, Pa.*

The Lesser Yellow-legs in Center County, Pennsylvania.—

The Lesser Yellow-legs (*Totanus flavipes*) is one of the rarest of the spring waders in Pennsylvania, and it gives me pleasure to be able to record the species for the first time from Center County. The first specimen was taken on April 1, 1909, by Mr. Foster White, near State College, Pennsylvania. While collecting in the same vicinity on April 20, 1909, I observed another of the same species and finally collected it. These two captures stand alone as representing the status of the Lesser Yellow-legs in Center County.—RICHARD C. HARLOW, *State College, Pa.*

Early Nesting of the Barn Owl in Delaware.—

In a Wilmington, Del., newspaper for April 20, 1909, is a rather sensational report of the capture on April 19 of a strange bird on a marsh near that city, and in the same paper for April 22, A. D. Poole, Esq., President of the Delaware Game Protective Association, identified the bird as a juvenile Barn Owl (*Aluco pratincola*), and in a letter to me Mr. Poole says the bird was apparently about six weeks old. On April 25, I saw this bird. It was confined in a large wire cage, such as are sometimes used for Parrots. The owner told me it had been found on the ground, and was unable to fly. This was evident. The primaries were now fairly well developed but many of the wing feathers were only just protruding from the sheaths; down was on many of the feathers of the back and the entire under parts were covered with down. The tail was but little over half adult length. It twice climbed up the sides of the cage and exercised its wings. The development was not quite as far advanced as Mr. Finley in his 'American Birds' shows as "8 weeks old." It was probably about seven weeks old, and if so, and allowing two weeks for hatching, the egg must have been laid by February 21, which is very much earlier than the usually recorded dates.

In 'Cassinia' for 1904, Mr. Thos. H. Jackson gives May 15, "one egg was already pipped." "Early in May....another....nest of six eggs was found...." Again, "Early in December, 1904, a young Barn Owl was found dead....it was still partly covered with down and could not have been over 8 weeks old, so that it must have been hatched about the first of October. This would seem to confirm some of the accounts we have had of the irregular nesting habits of these birds."

Audubon gives dates: a single egg, November 8, 1832 (St. Augustine, Fla.); at Charleston, S. C., "The eggs....must have been laid....about the 15th of September [1833]." Other dates for nesting I find are: Santa Clara, Cala., April 14, 1891, 4 eggs (Reed); Rio Frio, Texas, May (Bd., Br. and Ridg.). Dr. A. K. Fisher says in 'The Hawks and Owls of the United States,' p. 137, in summarizing the nesting time of this species: "Except in the more northern parts of its range, where it breeds as late as June, it is probable that the majority of eggs are deposited in March." Maj. Bendire states, 'Life Histories of North American Birds,' Pt. 1, p. 327: "....At Washington City, District of Columbia....they begin nesting from the last week in April to about the 10th of May."

As the species is not found breeding on the Atlantic slope much farther north than Wilmington, Del., this young bird must have been from an unusually early nesting pair, or the early dates heretofore have been overlooked.—C. J. PENNOCK, *Kennett Square, Pa.*

Northern Breeding Limit of the Chuck-wills-widow.—In 'The Auk' (XXV, 1908, p. 478) I gave what I believed to be the first record of the breeding of this species north of James River, Virginia. Yesterday, May 23, while walking through an open piece of pine woods near my house about 6.30 P. M., I flushed a female from a set of two eggs, which I found were incubated about five days. This is exactly a year to a day from the date my father took the first set. While two pairs have been around my home since April 4, and I have seen them flit by about dusk, it has only been within the last two weeks that I have been able to flush one in the day time. I think it is safe to say their breeding range extends northward to the high river banks on the north shore.—H. H. BAILEY, *Newport News, Va.*

The Starling near Springfield, Mass.—A Starling (*Sturnus vulgaris*) was caught by a cat, in Hadley, eighteen miles north of Springfield, January 25, 1909. In February and through the early spring a number of these birds were seen in this vicinity, and during the present month a pair has been found breeding in Agawam, on the west side of the Connecticut River. Apparently the range of the Starling in this country is extending north and inland.

I do not think it is probable that the Starlings that have recently been seen in this vicinity are the survivors or descendants of those introduced here twelve years ago. At least it is not possible that these birds could

have been residents of this region for more than ten years without their presence being noticed. There are more observers of birds here than there were forty years ago, and the least reliable of these would hardly be mistaken in identifying a Starling, especially if it was seen during the colder months.— ROBERT O. MORRIS, *Springfield, Mass.*

The Capture of the Red-eyed Cowbird in Arizona.— It is with the greatest pleasure that I report the capture of an adult male of *Tangavius aeneus involucratus* from near Tucson, Ariz. As far as I have learned, this bird has hitherto been found only in Texas and eastern and southern Mexico. However, it is certainly more than an accidental visitor here. I have seen it for over a month (from April 11 to May 21). A few days ago I noted two males courting a female. They held their heads up very high, as all cowbirds do, but followed each other around very sedately. The males took turns in driving the other a short distance away, and following the female. Yesterday a male, before a female, went through contortions similar to those frequently preformed by the domestic gobbler. Resting on his tarsi, with wings and tail spread and ruff raised, he quivered very noticeably. The slight movement of the wings slowly raised him, still trembling, some six feet above the female, where he paused a moment, a droll sight, and then sank slowly down beside his would-be mate, apparently quite exhausted by the violent, unusual exercise. The song is an even more pleasing combination of squeaks than that of the common cowbird. I have heard it only from solitary males in trees.

Whether these birds crossed New Mexico, or whether they came up the west coast of Mexico, is a question. At any rate they are far out of their supposed range. The specimen is in the University of Arizona Museum.— S. S. VISHER, *Carnegie Laboratory, Tucson, Ariz.*

The Present Status of the Meadowlark (*Sturnella magna*) near Portland, Maine.— In 1882, in his 'Catalogue of Birds Found in the Vicinity of Portland, Maine,' Mr. Nathan Clifford Brown stated that this bird was a rare summer resident, oftenest seen in migrations. The extreme dates then given were April 22 and Nov. 3.

To-day the conditions are decidedly different, and while the increase of which I shall speak seems to have been somewhat general in the southwest quarter of the State, I shall confine my remarks strictly to the section embraced in Mr. Brown's paper of 1882, viz., the vicinity of Portland. I had been collecting several seasons in fields in which the bird is now regularly seen in some numbers without meeting a specimen until 1891, when I found and collected a lone specimen at Westbrook. In August of the same year, in fields I had regularly visited in the adjoining town of Gorham, two small flocks, one of five, and one of eight birds, were seen. From that time to the present, May, 1909, there has been a slow but positive increase and dispersal of the birds through the section. They are not only rather plentiful in certain Westbrook and Gorham fields, but are to be found in several

places in the very outskirts of the city of Portland, and also in Falmouth and Scarborough.

The earliest date on which I have noted the bird's occurrence in spring is March 27. They have frequently shown a tendency to remain late in fall, having been recorded in November several years, in December twice, and in January once, in Westbrook. The winter just passed, 1908-09, a small flock actually wintered on the marshes back of Pine Point Beach in Scarborough, where they were watched with great interest by Mr. Walker, agent of the Pine Point R. R. station.—ARTHUR H. NORTON, *Portland, Maine.*

Another Hoary Redpoll (*Acanthis hornemanni exilipes*) **at Westbrook, Maine.**—On February 14, 1909, in a garden in the outskirts of Saccorappa village, Westbrook, I collected an adult male Hoary Redpoll. It was accompanied at the time by another bird, which I believe to have been of the same form, but this was not positively determined. Two and three birds had been visiting the place for several days previous to the capture, and I had become positive that one at least was a Hoary Redpoll, undoubtedly the one secured.—ARTHUR H. NORTON, *Portland, Maine.*

Late Records for Siskins in Chester County, Pa.—April 24, 1909. To-day I watched 7 Pine Siskins, *Spinus pinus*, for several minutes as they were feeding out on the twigs of some young apple-trees close to our lawn. They were extremely active and gentle, and confiding as usual, so that I was frequently within less than fifteen feet of some of them. I find in 'Cassinia' for 1904, Mr. Keim noted them at Bristol, Pa., 20 miles north of Philadelphia, on April 24, 1904, and in the same journal for 1902 are the following later New Jersey records, the last one being from considerably farther south than my home: At Plainfield, April 26 to May 11 (Miller); at Moorestown, April 28 to May 5 (Mickle); at Bridgeton, May 10 (Rhoads and Stone).

April 30, 1909. At noon to-day I saw 10 or 12 Siskins busily gleaning on one of the large Norway firs on our lawn. They remained till scared away by a passing trolley car.—C. J. PENNOCK, *Kennett Square, Pa.*

The Third Specimen of the Summer Tanager for Canada.—On May 7, while Messrs. J. S. Wallace and B. H. Swales were searching the end of Point Pelee for migrants, Mr. Wallace found a female summer Tanager (*Piranga rubra*) sitting quietly on a tangle of grape vines growing over some low trees. The bird was immediately shot and is now in the collection of Mr. P. A. Taverner, Detroit. Two other specimens have occurred in Ontario,—one seen near Hamilton in May, 1885 (McIlwraith, *Birds of Ontario*, p. 335), the other taken near Toronto in May, 1890, and now in the National Collection of the Geological Survey of Canada.

From the same locality I received in mid April a male Mockingbird which had been taken by Mr. Albert Gardiner. This is the second specimen of

this species that has come from Point Pelee within three years.—W. E. SAUNDERS, *London, Ontario*.

Prothonotary Warbler taken on the Coast of Maine.—A number of bird skins collected between about 1867 and 1874 by the late Levi L. Thaxter and his two sons have recently come into the possession of the Museum of Comparative Zoölogy. Among them is a beautiful adult male Prothonotary Warbler in fresh nuptial plumage. Like many of the others it is encircled by a broad, close-fitting paper band into which, no doubt, it was slipped when freshly skinned and put away to dry, according to a practise much in vogue half a century ago and one followed rather frequently, although not invariably, by the Thaxters. This band was made to serve the place of the usual tag or label, for on it is clearly inscribed in ink, and in the handwriting of Mr. Levi L. Thaxter, the following brief record:—"Matinicus Id., Me., August, 1868."

In addition to these data there is the word "Lonys" faintly written in pencil. "Lony," it seems, was a familiar nickname applied to Dr. Roland Thaxter in his early youth and sometimes used in the possessive case to designate the birds which he himself had killed. Although he has no distinct recollection of the Prothonotary Warbler his brother John, whom he has just questioned on the subject, remembers it perfectly and is certain that it was shot on Matinicus Island. It is not less reassuring than satisfactory to have so positive a statement from such a source; for when Mr. Samuel Henshaw first called my attention to the bird I could not help suspecting, and indeed, suggesting to him, that its original paper wrapper might easily have been exchanged through accident for that of some other skin of similar size, prepared in the same way. There is, I believe, but one record besides this of the occurrence of the Prothonotary Warbler in Maine. It relates to a specimen taken by the late Mr. George A. Boardman at Calais on October 30, 1862.¹—WILLIAM BREWSTER, *Cambridge, Mass.*

The Races of the Parula Warbler.—On a short trip to Seaford, Delaware, in June, 1908, Mr. James Chapin and the writer found the Parula Warbler an abundant bird along the Nanticoke River. The subspecific identity of the breeding bird of Delaware has heretofore been uncertain, Ridgway stating that the southern form, true *Compsothlypis americana*, probably reached the State. To settle this question, five males and one female were collected. The males are all fully adult birds, none being in the immature first nuptial plumage. They prove conclusively that the Delaware bird belongs to the northern form, *usnea*. The size and proportions of wings and bill agree nearly with *usnea*, while the coloration, though perhaps not typical, is nearer this race. Three of the specimens have a blackish jugular band, while the two others have no trace of it. In this species, however, the total absence of blackish seems to be an individual peculiarity and as

¹ Verrill, Proc. Boston Soc. Nat. Hist., IX, 1863, p. 234.

frequent in the northern as in the southern form. Such birds, judging by their remiges and wing-coverts, are not necessarily immature birds but may be fully adult.

Ridgway states (Bds. N. and M. Amer.) that a considerable number of specimens from the range of *usneæ* (Massachusetts, New York, etc.) are indistinguishable from true *americana*. As far as the color goes this is doubtless due to individual variation, but the writer believes that the northern specimens agreeing with *americana* in proportions are almost always immature birds in the first nuptial plumage. In such specimens, as in most other Warblers, the wing averages slightly shorter than in fully adult birds, and as the bill is as large as in the adult, the relative lengths of these parts thus resemble those of the southern race. If *adults* only of the two races are compared the differences in measurements and proportions are found to be more constant.

There seems to be a slight average difference in coloration between *usneæ* of the Atlantic States and the Mississippi Valley bird, which has been separated as *ramalinæ*. The latter usually has the jugular band more conspicuous and of a deeper black. The characters that separate these two races are so slight, however, that the decision of the A. O. U. Committee in rejecting *ramalinæ* is doubtless a wise one. There is no difference in proportions between the latter and *usneæ* nor so pronounced a difference in color.

The following table shows the average measurements of males, in millimeters, according to locality and age.

		Wing	Tail	Bill from nostril
Florida and southern Georgia	4 im.	56.2	41.3	7.8
	6 ad.	57.8	42.5	7.6
Delaware	5 ad.	60.4	44.9	7.1
Northern New Jersey to Massachusetts	9 im.	59.2	43.	7.3
	8 ad.	61.4	43.8	7.2
Texas	3 im.	55.1	41.2	7.
	5 ad.	58.6	42.5	7.2
Michigan and Minnesota	2 im.	57.8	41.6	7.
	3 ad.	60.1	42.6	6.9

W. DEW. MILLER, *Amer. Mus. Nat. Hist., New York City.*

Breeding of the Louisiana Water-Thrush (*Seiurus motacilla*) in Berkshire County, Massachusetts.—On the afternoon of June 28, 1902, I was following up the course of a brook in Glendale, Berkshire County, Massachusetts, in company with my old friend and schoolmate, Daniel Chester French, when we came to a secluded, shallow pond, less than a quarter of an acre in extent, lying between two wooded ridges of moderate elevation. It was made, a number of years ago, for the purpose of obtaining ice, by a farmer living in the neighborhood who built a rude dam across the brook at a point where, after winding sluggishly through what was then a grassy

meadow, it raced down a rather steep incline between well defined banks overgrown with mountain laurel and densely shaded by trees of various kinds. As we approached the pond we heard a Water-Thrush chirping sharply. A moment later it appeared at the edge of a thicket with something in its bill which looked like a large grub but which did not prevent it from continuing to utter its metallic note, at short, regular intervals. It was soon joined by its mate, the male, I thought. He, also, chirped but less anxiously and frequently than the other. Both birds now began flitting close about us, enabling us to make sure that they were Louisiana, and not Northern, Water-Thrushes. They came, indeed, so very near and into lights so favorable for revealing their characteristic color and markings that we were left in no doubt whatever as to their identity. After watching them for several minutes we advanced and almost immediately discovered their nest, which was within twenty feet of where we first saw them. It contained six young, well feathered and almost large enough to fly although they kept their eyes tight shut while we were looking at them, perhaps in the hope that by so doing they might escape notice. They crowded the nest to its utmost capacity and the coloring of their upper parts — a rich, deep, seal brown — closely matched that of the mud-soaked leaves which formed its outer surface. It was the largest nest of a Water-Thrush that I have ever examined. The crown of a man's hat would not have held half its total bulk. Its situation, also, was somewhat unusual for it was placed on the side of a shallow pit which had been dug at the base of a bank to obtain earth for the construction of the dam. The rear wall of this excavation was vertical — or even overhanging — at the top at several points, but the birds had selected a place where it merely sloped steeply downward and outward and had here built their nest on a slight projection or knob scarce a foot above the level ground beneath, and wholly unsheltered above, either from observation or from the weather. I did not return to the spot that summer but I have since revisited it almost every year, about the same season, without obtaining evidence, however, that the birds have again nested there or, indeed, anywhere in the immediate neighborhood.

Mr. Walter Faxon, to whom I mentioned the above described experience not long after it had occurred, wrote me on October 14, 1902, as follows: "If you record the Southern Water-Thrush's nest (as I hope you will) you might take the occasion also to mention that I found a male [of this species] still in song on the 8th of June, 1901, at Richmond Pond, on the line between the townships of Richmond and Pittsfield." Doubtless this bird is distributed well over the southern half of Berkshire County.— WILLIAM BREWSTER, *Cambridge, Mass.*

Concerning *Thryomanes bewicki cryptus* in Colorado.— Merritt Cary, in 'The Auk' for April, 1909, p. 185, records *Thryomanes bewicki cryptus* from Shell Rock Cañon, in the northwest corner of Baca County, although the specimen was not secured, and was merely supposed to belong to this form,

rather than to *bairdi*, which has long been known from the State. The last week in April, 1909, I secured two specimens of wrens at Irwin's Ranch, Las Animas County, about twelve miles due west of Shell Rock Cañon, and exactly the same sort of country (rocks, cedars, and piñons), which have been compared by Mr. W. L. Sclater with specimens in the Colorado College Collection, and he informs me they are undoubtedly *bairdi*. This being the case, it seems more than likely that the bird seen by Cary was also *bairdi*, and that *cryptus* should be eliminated from the Colorado list until more positive evidence is obtained.—EDWARD R. WARREN, Colorado Springs, Colo.

A Correction.—In my paper on Colorado birds in 'The Auk' for April, 1909 (p. 184), *Thryomanes bewickii cryptus* was definitely listed as a new record for the State, on the strength of a field identification made in Baca County. Through an unaccountable oversight the form *cryptus* was not queried, and hence the record appeared as definite, instead of tentative. Since Mr. H. C. Oberholser now considers all of the western Texas Bewick wrens to be *eremophilus* (= "*bairdi*"), the record should stand as *Thryomanes bewickii eremophilus*.¹

In the same paper a specimen of *Catherpes* from Baca County was listed as *C. m. conspersus*. Upon examination Mr. Oberholser calls this specimen *C. m. polioptilus*.¹ The statement made that Gaume's Ranch, Baca County, is the most eastern locality for Colorado is erroneous, since Mr. E. R. Warren² has already recorded the Cañon Wren from Cheyenne Wells, near the Kansas line.

The above errors were due to the writer's absence from Washington in the field.—MERRITT CARY, U. S. Biological Survey, Washington, D. C.

Bicknell's Thrush (*Hylocichla aliciae bicknelli*) in Cumberland County, Maine.—Having recently had occasion to examine some Gray-cheeked Thrushes, all of the specimens contained in the collections of the Portland Society of Natural History and of the writer were brought together. This revealed the fact that a specimen in the Natural History Society's collection is a Bicknell's Thrush. It is a young female, taken in Cumberland County, Maine, September 30, 1878. Although the specimen is so characteristic that no doubt existed as to its identity, it was submitted to Dr. Charles W. Richmond for verification.

There appears to be no previous record of a specimen taken in Maine, yet it has been reported, in each instance without capture of a specimen, from the following localities: Franklin, 1906 (D. W. Sweet, Journ. Orn. Soc., VII, p. 81); Oxford, 1899 (A. P. Larrabee, verbal); Piscataquis, 1898 (F. H. Allen, Auk, XV, p. 60).—ARTHUR H. NORTON, Portland, Me.

[¹ The proper name of this form is *bairdi* (cf. Auk, XXV, July, 1908, p. 385). Neither "*eremophilus*" nor "*polioptilus*" are recognized in the A. O. U. Check-List (cf. Auk, l. c., p. 397).—EDD.]

² Condor, IX, 1907, p. 111.

The Rank of Certain Groups of Birds.—The following changes in the rank of certain groups in the A. O. U. Check-List seem desirable in order to make those of the same grade of more equal value.

The Cuculi (including the Cuculidæ and the African Musophagidæ), and the Striges should both be raised to full orders. The former are, by all recent authorities, given higher rank than is accorded them in the Check-List. They possess certain characters separating them from all the other Picarian birds (the Trogones, Alcyones, Pici and Macrochires of the List and other extralimital groups) and allying them with the Gallinaceous birds and the Parrots. As to the Striges there now seems little doubt that they are not really related to the diurnal birds of prey but are nearer the Goatsuckers. However this may be, the Owls are so different from the Hawks and Vultures that they should be ordinally separated.

The subfamilies Fulmarinæ and Puffininæ should be united in a family Puffinidæ, as is done in the British Museum Catalogue by Salvin, who gives several excellent characters to distinguish them from the other Tubinares. The Oceanitinæ, comprising the long-legged Petrels, are characterized by eight or ten good anatomical characters, and also merit family rank. These two groups are at present given the same grade in the List as the Gallinulinæ and the Sterninæ, but are undoubtedly of much higher value. In fact they are better marked than several of the families now recognized, as the Odontophoridæ, Meleagridæ, Tetraonidæ, and certain Limicoline groups, and probably also the Buteonidæ, Plataleidæ, Rynchopidæ and others. The fact that all the essential characters of the Puffinidæ and several of those of the Oceanitidæ are internal, is doubtless the reason why their recognition as families is not more general.

With the Falconidæ restricted to the true Falcons, the Caracaras, and their few near allies, it is now desirable to recognize a subfamily Polyborinæ to include *Polyborus* and the extralimital genera *Ibycter* and *Milvago*.

In the Check-List the Aramidæ are included in the suborder Ralli. In all internal characters and in pterylosis, however, *Aramus* is strictly Gruine and should be placed nearer the cranes as is done by Gadow, Sharpe, and other authorities.—W. DEW. MILLER, *Amer. Mus. Nat. Hist.*, New York City.

Three Records for British Columbia.—*Aluco pratincola*. BARN OWL. Messrs. Jose and Faulks, taxidermists, of Vancouver, recently showed me a fine female Barn Owl, shot by a Mr. McKenzie at Ladner's landing, not far from the mouth of the Fraser River. The cere and feet were still soft, as the specimen had just been mounted; the date of capture would be about 7th April, 1909. It was a female with the ovaries much enlarged.

Strix occidentalis caurinum. NORTHWESTERN SPOTTED OWL.—On the 26th January of this year I shot a fine female of this owl at Chilliwack, B. C., the first I have seen in the flesh in over twenty years' collecting in this Province. It was killed during a cold snap of exceptional severity.

Catherpes mexicanus conspersus. CAÑON WREN.—Last spring Mr. C. deB. Green of Fairview, B. C., was convinced that the Cañon Wren was a scarce though regular breeder in the extreme southern portion of the Okanagan Valley in the semi-arid interior. He was unable at that time to place the identification beyond a doubt by the capture of a specimen. I have just received from him a rough skin of a male taken the third week in March of this year at McIntyre Creek, a mountain stream which flows into Okanagan River from the east, some twenty miles north of the International Boundary. It was one of a pair that were evidently nesting at that early date, so the species will probably prove to be a permanent resident in that district. Mr. Green has since located another breeding pair near the north end of Osoyoos Lake.—ALLAN BROOKS, *Okanagan Landing, B. C.*

Some New Birds for Colorado.—Since unavoidable circumstances have prevented the publication in this issue of 'The Auk' of a lengthy article on Colorado birds, it seems best to present here a short note on the occurrence of four species hitherto unrecorded for the State.

Sterna hirundo. COMMON TERN. One was noted May 14, 1908, at New Windsor by Geo. E. Osterhout. The specimen was sent to the Biological Survey for identification.

Butorides virescens. GREEN HERON. One at Loveland, July 23, 1895, by Edward A. Preble of the Biological Survey.

Spizella pusilla arenacea. WESTERN FIELD SPARROW. One at Yuma, May 9-11, 1908, by Miss Jennie M. Patten, who for the past six years has been reporting bird movements to the Biological Survey.

Helminthophila chrysoptera. GOLDEN-WINGED WARBLER. One May 25, 1906, at Yuma, by Miss Patten.—WELLS W. COOKE, *Biological Survey, Washington, D. C.*

Notes concerning Certain Birds of Long Island, New York.—A few data concerning the occurrence of certain of the less commonly observed birds of Long Island and of facts regarding the time during which others, less rare, extend their stay within our limits, are herewith presented. Most of them have been kindly furnished me by other observers.

Porzana carolina. SORA. A specimen of this rail was obtained by Mr. Robert L. Peavey, of Brooklyn, at Seaford on the unusually late date of December 24 (1908). This date is two months later than the previously ascertained limit of its occurrence here in autumn, as given in 'A List of the Birds of Long Island, New York.'

Coturnicops noveboracensis. YELLOW RAIL.—Three additional occurrences of this bird for Long Island have been made available through Mr. Robert L. Peavey. All were secured recently, two during the later months of 1908, one in January, 1909. One of the specimens, taken by Mr. Peavey and by him presented to the Museum of the Brooklyn Institute of Arts and Sciences, has been already recorded by Mr. George K. Cherrie, curator

of ornithology of the Museum. Mr. Cherrie says: "This specimen was collected by the donor at Seaford, Long Island, September, 1908" (Museum News, Vol. IV, March, p. 85, 1909). I learn from Mr. Peavey that it was taken on the bay side of the beach, back of the sand dunes, where the "sedge" grass grew in tufts. In one of these the bird was concealed, and was only flushed on a near approach, so that care had to be exercised in collecting it so that it should not be rendered unfit for preserving as a specimen. It was taken Sept. 20, 1908, and is a male.

A second specimen, also a male, was taken by him at the same place on December 4, 1908. This one was found on the edge of the main creek, in the short salt-meadow grass. A third specimen was obtained on January 10, 1909, at the same place, in a similar location. This specimen, through the generosity of Mr. Peavey, is now in the writer's collection of skins.

Cathartes aura. TURKEY VULTURE. A very fine male specimen of this vulture has been added to my collection through the generosity of Mr. Roy Latham of Orient Point. Mr. Latham briefly stated the facts of its occurrence in his record of the species of birds observed by him at Orient Point on Dec. 22, 1907, which was published in the 'Bird-Lore' Christmas bird-census (Vol. X, 1908, p. 29). Mr. Latham informed me that the bird was unable to fly when first discovered by him on the beach. It was at once evident that it was disabled, and it was found that it had some foreign substance in its throat. This had, no doubt, prevented it from eating for so long a time that it had become too weak to fly. The cause of the obstruction in the throat was found to be a bone of an animal of considerable size. Mr. Latham extracted the bone and removed the bird to his home, where it was cared for and protected. He fed the bird, and found that it ate greedily of stale fish. Despite his care, however, it did not survive the following night.

Catharista urubu. BLACK VULTURE.—I am indebted to Mr. C. W. Crandall of Woodside for the report of the capture of a specimen of this bird which so rarely reaches us from more southern regions that this may perhaps be regarded as the first specimen authenticated beyond a doubt, or, at least, backed by an authenticated skin, taken within the actual geographical limits of Long Island. As stated in 'A List of the Birds of Long Island,' p. 67, the evidence entitling it to a place in the avifauna of Long Island rests on the authority of Mr. Robert Lawrence who observed it on the adjacent shore of Sandy Hook, and of Mr. deL. Berier, who reported one found dead at Coney Island beach, by Mr. Akhurst. As no authenticated skin of this specimen is extant, that of Mr. Crandall's is all the more valuable. Mr. Crandall was at Plum Island, L. I., on May 19 and 20, 1895, and on exactly or nearly the same dates on the three subsequent years, in the interests of ornithological investigation. It was on the second trip, namely, 1896, on the 19th or 20th of May, or within a day or two of these dates, that the bird was shot. He was in the field, bird-nesting, when, hearing a distant gun-shot he was attracted to investigate the cause. He found that the shot had been fired by a farmer, at a large bird which had

been feeding on a dead sheep. The farmer — a Mr. Clark — finding that there clung to the bird an odor not incompatible with its feeding habits, had consigned his prize to the furrow where the plowshare would shortly have buried it. From this position Mr. Crandall, with prompt and commendable collecting zeal, rescued the specimen and sent it to a New York taxidermist (Murgatroyd) for mounting. Mr. Crandall still has the mounted skin in his possession, and, at his home, the writer recently had the pleasure of examining it.

Nyctea nyctea. SNOWY OWL. Mr. Peavey has kindly informed me, and has permitted me to record the fact, that he took a very white specimen of this species on the shore of Flatlands Bay on Feb. 19, 1909. This is a rather later date of occurrence of this species than any previous ones which I have.

Acanthis linaria. REDPOLL. It may be worthy of note that Redpolls occurred again on Long Island this winter, although, apparently, less abundantly than last. Though several were seen by others, but a single individual came under my direct observation. It was seen feeding on the ground, among a number of Pine Siskins in Prospect Park on Jan. 30, 1909.

Dendroica palmarum. PALM WARBLER. A specimen of this warbler was taken by the writer on Rockaway Beach, Sept. 26, 1908. It was found among the sand dunes on the bay side of the beach on the date mentioned, where numbers of Savannah and other sparrows were also found. Like them it seemed much at home in this open, unsheltered locality. Here the sand is but scantily covered, the sea-side golden-rod at this season being the most conspicuous of the sea-side flora. Thompson, in his 'Birds of Manitoba,' mentions finding this bird, during migrations, far from any wooded land, and Chapman refers to the avoidance of trees by the eastern subspecies, *hypochrysea*, in his 'Birds of Eastern North America.' Since the autumn of 1895, when it was met with repeatedly, as stated in 'The Auk' (XIX, 1902, p. 148), it has not been again met with until this autumn (of 1908).— WILLIAM C. BRAISLIN, Brooklyn, N. Y.

RECENT LITERATURE.

Jubilee Meeting of the British Ornithologists' Union.—The Fiftieth Anniversary of the founding of the British Ornithologists' Union was celebrated on Wednesday, December 9, 1908, at the house of the Zoölogical Society of London, 3 Hanover Square, with appropriate addresses and the presentation of medals to the surviving Founders, followed by a dinner in the evening at the Trocadero Restaurant, attended by 81 members and 24 guests. At the meeting letters and telegrams were read from the South African Ornithologists' Union, the Ornithologische Gesellschaft in Bayern, from a number of Foreign Members, and an address from the Deutsche Ornithologische Gesellschaft.

An address by the President, Dr. F. Du Cane Godman, summarized briefly the work of the B. O. U. and its members, and the wonderful recent progress of ornithology. It was noted that in 1864, when the first volume of the 'Zoölogical Record' was published, only "120 papers on ornithology were enumerated for the previous year, while on turning to that for 1907 there were no less than 1760, or fifteen times as many as there were thirty-three [forty-three] years earlier." He also stated that in 1872 there were only about 30,000 stuffed birds and bird-skins in the British Museum, while now there are 500,000, or sixteen times as many as in 1872. "These two instances," he added, "will give some idea of the progress ornithology has made since the foundation of the British Ornithologists' Union." He also referred to the leading contemporary journals of ornithology, as the 'Journal für Ornithologie,' begun by the German Ornithological Society six years before 'The Ibis'; and adding: "Perhaps the Society next in importance is the American Ornithologists' Union, with its quarterly Journal 'The Auk,' a most valuable work chiefly devoted to the birds of its own Continent."

The President's address was followed by the reading of a "short history of the Union" by Dr. P. L. Slater, and some details of the 'Biographical Notices' were given by Mr. A. H. Evans. These include sketches, mostly short, of the twenty Founders, the principal contributors to the first series of 'The Ibis,' and of the present officials of the Union, with portraits of each. Then followed the presentation of medals to the four surviving original members of the Union, namely, Dr. F. Du Cane Godman, Dr. P. L. Slater, Mr. W. H. Hudleston, and Mr. Percy Godman.

The 'Proceedings' of this memorable celebration have now been issued as a special 'Jubilee Supplement' to 'The Ibis,' forming a volume of 272 pages, illustrated with 40 portraits. This fascinating record consists: (1) Proceedings (pp. 1-18); (2) A Short History of the British Ornithologists' Union (pp. 19-69); (3) Biographical Notices of the Original Members, the

¹ Ninth Series, Vol. II, 1909. Published March, 1909, pp. iv + 268, and 40 pll. (portraits).

principal contributors to the first series of 'The Ibis' (1859-1864), and the present officers (pp. 71-232); (4) List of Members (pp. 233-268).

Dr. Sclater's history of the founding of the Union recounts the first steps taken in the formation of this great agent in the promotion of ornithological research during the half century now just ended. The account of the inaugural meeting, held in the rooms of the late Professor Alfred Newton at Magdalene College, Cambridge, November 17, 1858, is less full than could be desired, no formal record of it having been found. It apparently comprised eight ornithologists, who decided upon a list¹ of twenty persons who were to be invited to become founders. Two resolutions were adopted, which were to the effect that an Ornithologists' Union of twenty members should be formed, "with the principal object of establishing a new Journal entirely devoted to Birds"; and that Lieut-Col. H. M. Drummond should be the President, Professor Newton the Secretary, and Dr. Sclater the Editor of the proposed Journal. Steps were immediately taken by the Editor to secure a publisher, and the first number was ready for the press about the middle of January, 1859. Then follows a history of 'The Ibis,' volume by volume, for the next fifty years, giving briefly the principal events in its history and in that of the Union, from which we learn that the first general meeting of the B. O. U. was held in London on November 9, 1859; but the minutes of this meeting, like many other early papers relating to its organization, "have not been found." At the annual meeting held in 1860 it was voted to elect ten Honorary Members from "ornithologists not residing in the United Kingdom," among whom were Professor S. F. Baird of Washington and John Cassin of Philadelphia. The only other Americans on whom this honor has been conferred are Robert Ridgway, elected to this class in 1903, and the Editor of 'The Auk,' in 1907. In 1872 a new class, designated as Foreign Members, was instituted, to which fifteen distinguished foreign ornithologists were elected, among whom were two from America — Coues and Lawrence. In later years were added Ridgway in 1880, Marsh in 1883, Allen in 1890, Stejneger in 1900, Chapman in 1902, Oberholser in 1905, and Richmond in 1908.

The 'List of Members' includes the names of all who have been elected to the different classes of membership since the organization of the Union, this roll numbering 719, of which the roster at the close of 1908 carried only 473, a large number having died in the half century of the Union's existence. Of the 650 elected to the class of Ordinary Members, only 343 were in good standing in 1908, deaths, resignations, and delinquency in payment of dues accounting for the large reduction in the half-century total. Of the 3 elected as Extraordinary Members, 2 remain; of 21 elected as Honorary Members (limited to 10) 11 have passed on; the class of Colonial Members, instituted in 1903 and limited to 10, numbers 8, with 1 deceased; the list of Foreign Members (limited to 20) contains 19; of the 36 who have received this honor 17 have died.

¹ A facsimile of this list, in the handwriting of Newton, with additions in the handwriting of Sclater, is here given (plate facing p. 21).

While the membership roll, giving as it does the date of election, the date of death of deceased members, the date of resignations, etc., has the strong element of personal interest that always attaches to such a record, the biographies and portraits have permanent value as a concise history of a large number of the leading British ornithologists, many of whom have finished their work and left an enviable record.

The Jubilee Meeting of the British Ornithologists' Union is further noteworthy as the occasion of the initiation of a plan proposed by Mr. Ogilvie-Grant for the exploration of the Charles Louis Mountains in Dutch New Guinea, which are believed to rise to an altitude of from 16,500 to 17,500 feet, and to constitute at the present time "beyond doubt the finest unknown ground in the world." It is Mr. Grant's desire to associate this undertaking with the British Ornithologists' Union, "so that it may be known as the 'British Ornithologists' Union Jubilee Exploration of the Charles Louis Mountains'." The proposition, when put to vote, received unanimous approval, and a Committee was appointed to coöperate with Mr. Grant in securing the necessary funds for the enterprise.—J. A. A.

Thayer and Bangs on the Birds of Guadaloupe Island.¹—Guadaloupe Island is situated off the coast of Lower California, about 220 miles southwest of San Diego. Practically nothing was known of its fauna till 1875, when it was visited by the well-known collector Dr. Edward Palmer. He obtained eight species of land birds, represented by 72 specimens. On investigation of this material Mr. Ridgway² found that while each species had a near relative on the mainland, the Guadaloupe forms were so far differentiated from them in each case as to warrant their recognition as distinct species. These differences consisted in the increased size of the bill and feet, shorter wings and tail, and darker colors in the island forms, due to insular environment. The island has since been repeatedly visited by ornithologists, including W. E. Bryant³ in 1885, who increased the number of species known from the island from 9 to 36, all land birds except 4, but adding none to the 8 previously described as peculiar to the island. Mr. Bryant, however, gave for the first time a detailed account of the topography, climate, and vegetation.

In the spring of 1906, Mr. W. W. Brown, Jr., with two assistants, visited the island in the interest of Messrs. Thayer and Bangs, and the present paper gives the results of Mr. Brown's work. Reference is made to the

¹ The present state of the Ornithology of Guadaloupe Island. By John E. Thayer and Outram Bangs. *Condor*, Vol. X, No. 3, May-June, 1908, pp. 101-106.

² Ornithology of Guadaloupe Island. By Robert Ridgway. *Bull. U. S. Geol. and Geogr. Surv. Terr.*, Vol. II, No. 2, April, 1876, pp. 183-195.

The Birds of Guadaloupe Island, discussed with reference to the Present Genesis of the Species. By Robert Ridgway. *Bull. Nutt. Orn. Club*, Vol. II, No. 3, July, 1877, pp. 58-66.

³ Additions to the Ornithology of Guadaloupe Island. By Walter E. Bryant. *Bull. California Acad. Sci.*, No. 6, pp. 269-318, Jan., 1887.

"alarming rapidity of the destruction" of the original biota of the island that is taking place, "due to the introduction of goats and cats. Already," it is stated, "many plants and three birds are gone and others are reduced to very small numbers, and the whole island seems threatened in the near future with absolute desolation — doomed to become a barren rock." The three birds that have already become extinct are the Caracara (*Polyborus lutosus*), a Wren (*Thryomanes brevicauda*), and a Towhee (*Pipilo consobrinus*). While the island is uninhabited at present by man, it is overrun by "between six and eight thousand" goats; cats are also numerous, and the house mouse (*Mus musculus*) has become well established. In the present paper 17 species are recorded as taken, several of them in large series, and two others as seen by Mr. Brown and his assistants. The list is copiously annotated with field notes made by the collectors, who were on the island from May 1 to June 28, but too late for the breeding season of most of the species. The Burrowing Owl (*Speotyto cunicularia becki* Rothschild and Hartert, based originally on a single specimen), of which 27 specimens were taken, is said to be "absolutely indistinguishable in any way" from the mainland form. While this is not quite true, the under wing covers being marked more or less with dusky streaks, instead of being unmarked as in the mainland form, the difference is thought by the A. O. U. Committee to be too slight to warrant the recognition of the island form as even a subspecies. — J. A. A.

Bangs on Birds from Western Colombia.¹— The basis of these 'Notes' is a small collection made in northwestern Colombia, just south of Darien, by Mervyn G. Palmer, a region hitherto ornithologically little known. "Although it contained but 110 species and subspecies, it is rich in rare and new forms," and should subsequent installments from Mr. Palmer prove of equal interest a list will be published of the birds of the region. In the present paper 5 forms that appear to be new are described and notes are given on a few other species.

In another paper of the same date² Mr. Bangs separates the Colombian form of *Rhynchocyclus sulphurescens* as *R. s. exortivus* subsp. nov. — J. A. A.

Bangs on Costa Rican Birds.³— The present paper includes notices of 35 species and subspecies, two of the latter being described as new. Most of the forms are rare, and the relationships of some others are considered. Thus the author's *Scotothorus verapacis dumicola* proves to have been founded on "differences due to individual variations." The known range of several of the forms mentioned is here extended. The paper is based

¹ Notes on Birds from Western Colombia. By Outram Bangs. Proc. Biol. Soc. Washington, XXI, pp. 157-162. July 27, 1908.

² A New Tyrant-Bird from the Santa Marta Region of Colombia. By Outram Bangs. *Ibid.*, p. 163.

³ Notes on Some Rare or not well-known Costa Rican Birds. By Outram Bangs. Proc. Biol. Soc. Washington, Vol. XXII, pp. 29-38, March 10, 1909.

on collections made for the author by Mr. C. F. Underwood from December, 1907, to June, 1908.—J. A. A.

Ridgway on New Genera, Species, and Subspecies of Tropical American Birds.¹—Of the 16 new genera here described, 9 belong to the family Formicariidae and 7 to the family Furnariidae; the 3 new species and 8 new subspecies, belong to the families Furnariidae and Dendrocolaptidae. In a foot-note (p. 74) the genus *Myrmelastes* is considered as inseparable from *Myrmeciza*, and *Myrmelastes lawrencii* Salv. and Godm. is stated to be the immature male of *Gymnocichla cheiroleuca*, and *M. corvinus* Lawr. (= *M. ceterus* Bangs) to be the same as *G. nudipes*.—J. A. A.

New North American Birds.—Mr. E. W. Nelson² has described a new thrush from Tamaulipas, Mexico, as *Catharus mexicanus smithi*, it differing from *mexicanus* in having shorter wings and tail and longer tarsi, and also slightly in coloration.

Messrs. Thayer and Bangs have recently described³ a new form of the Snowy Egret from San José Island, Gulf of California, about sixty miles north of La Paz, as *Egretta candidissima brewsteri*, on the basis of its large size, especially evident in "the enormously heavy legs."

Mr. Joseph Grinnell has proposed the addition of "three new Song Sparrows"⁴ from California. One of them is from "the extensive marshes at the confluence of the Sacramento and San Joaquin Rivers," and while resembling *Melospiza melodia gouldi* Baird (= *M. m. samuelis* Baird) in coloration, it is larger with a heavier bill, which is markedly more swollen at the base, and is hence named *M. m. maxilaris*. The second is the *M. m. gouldii* Baird, revived, which has of late been referred to *M. m. samuelis* as a synonym. A recent reexamination of a large amount of material by the A. O. U. Committee on Nomenclature, including specimens furnished by Mr. Grinnell, has failed to convince the Committee of the propriety of its recognition (see *antea*, p. 301). The third is from the vicinity of the Salton Sea and suitable localities along the Lower Colorado River, and is named *M. m. saltonis*. This form is considered by the same Committee (see *antea*, p. 301) as not separable from *M. m. fallax*, as commonly recognized—in other words, that *saltonis* is the Desert Song Sparrow of the arid Southwest. The type of *fallax*, unfortunately, proves not to be quite typical as to locality, being a winter specimen and a migrant, but *fallax*

¹ New Genera, Species and Subspecies of Formicariidae, Furnariidae, and Dendrocolaptidae. By Robert Ridgway. Proc. Biol. Soc. Washington, Vol. XXII, pp. 69-74, April 17, 1909.

² A New Thrush from Mexico. By E. W. Nelson. Proc. Biol. Soc. Washington, Vol. XXII, pp. 49, 50. April 17, 1909.

³ Description of a New Subspecies of the Snowy Egret. By John E. Thayer and Outram Bangs. Proc. New Engl. Zool. Club, Vol. IV, pp. 39-41. April 29, 1909.

⁴ Three New Song Sparrows from California. By Joseph Grinnell. University of California Publications in Zoology, Vol. V, No. 3, pp. 265-269. April 9, 1909.

has nevertheless been accepted as the name of the form of which *saltoris* may perhaps be regarded as the extreme manifestation. In the opinion of the A. O. U. Committee there is not room nor good reason for admitting two forms of the pallid phase of the Song Sparrow. It unfortunately happens that this is another of the many cases where the type of a form is unsatisfactory, being more or less intermediate between two forms which are sufficiently differentiated in their respective areas of full development. To make such an unfortunate circumstance the basis or excuse for another 'split' seems hardly the wisest way to deal with such cases.— J. A. A.

Widmann on 'The Summer Birds of Shaw's Garden.'¹— Shaw's Garden,¹ or the Missouri Botanical Garden, at St. Louis, Mo., is the summer home of forty species of birds, while six others are here recorded as "more or less regular visitors from nearby breeding grounds." It is believed that several others would nest within the Garden if suitable nesting-boxes were provided for them, and suggestions are made for their arrangement in a way to render them undesirable to the House Sparrows.

Of many species of European songbirds introduced into St. Louis about 1870, only two seem to have secured a permanent foothold. These are the House Sparrow and the European Tree Sparrow. The former soon became abundant at St. Louis, as elsewhere; the latter has been able to maintain its foothold in various parts of the city, Shaw's Garden having "always been, and still is, one of the few places where the Tree Sparrow has found refuge and succeeds in rearing a few broods." The difference between the two species, in habits and temperament as well as in size and markings, are pointed out, and further emphasized by an excellent colored plate representing both species. The Tree Sparrow has suffered from the tyranny and persecution of its larger, more pugnacious and more prolific fellow-countryman, the House Sparrow, a plea for the repression of which and for the encouragement of the Tree Sparrow is here made. St. Louis and vicinity, says Mr. Widmann, is the only place in America where the Tree Sparrow occurs.

In his pleasant comment on the status and traits of the various species of summer birds in the Garden, he states that "the number of Blue Jays and Bronzed Grackles should always be kept limited to a very few pairs during the breeding time," owing to their depredations upon the eggs and nestlings of the smaller birds.— J. A. A.

Cole on 'The Crow as a Menace to Poultry Raising.'²— The economic relation of the Crow to agriculture is still an unsettled question, not so much in reference to its direct attacks upon farm crops and poultry, which are

¹ Summer Birds of Shaw's Garden. By Otto Widmann. 20th Ann. Rep. Missouri Botanical Garden, pp. 41-80, pl. 1, colored.

² The Crow a Menace to Poultry Raising. By Leon J. Cole. 21st Ann. Rep. Rhode Island Agric. Experiment Station, pp. 312-316, January, 1909.

rarely serious, as to its destruction of the eggs and young of other birds. Its depredations upon poultry are local and sporadic, and doubtless limited to a small proportion of the crow population of a given district. In the present paper Dr. Cole recites several well authenticated instances of considerable loss to poultry raisers from the fondness of crows for young chickens and ducklings. The author favors the non-protection of the crow by State laws, but believes it would be unwise to offer a bounty for their destruction. The crow has its good points as a destroyer of injurious insects, but in view of his general character as a nest-robber and chicken-thief, and his propensity for pulling up the farmer's young corn, it is doubtful whether his good deeds outweigh his many evil propensities.—J. A. A.

Swarth on the Distribution and Molt of Mearns's Quail.¹—Following a short account of the habits and distribution (illustrated with a map) of this quail (*Cyrtonyx montezumæ mearnsi*) Mr. Swarth gives a detailed account of the change from the juvenal to the first winter plumage, with illustrations of the various stages, from photographs, showing the ventral surface in thirteen specimens. Each stage of the change is described, and attention is called, apparently for the first time, to the sexual differences observable in the juvenal plumage.—J. A. A.

Godman's 'Monograph of the Petrels.'—Part IV,² dated April, 1909, completes the genus *Æstrelata*, and contains in addition the genera *Pagodroma*, *Bulweria*, *Macronectes*, *Fulmarus*, *Daption*, *Halobena*, and three of the four 'species' of *Prion*. From the known intergradation of the four forms of *Prion* (l. c., p. 286), three of them are evidently not properly entitled to the rank of species, and their interrelationships would be better expressed by the use of trinomials. *Bulweria macgillivrayi* is known only from a single specimen, as is also *Æstrelata fisheri*, and there are only two known examples of *Æ. heraldica*.

As in previous parts, we have here a most satisfactory summary of the history, characteristics, and relationships of these, for the most part, little known pelagic birds.—J. A. A.

Howard's 'The British Warblers,' Part III.—Part III³ of this remarkable monograph merits fully the liberal praise we bestowed upon Parts I and II

¹ Distribution and Molt of the Mearns Quail. By H. S. Swarth. Condor, Vol. XI, No. 2, March-April, 1909, pp. 39–43, 1 pl. and 3 text figg.

² Part IV, pp. 223–296, pll. lxxix–xcix. April, 1909. For notices of previous parts see Auk, XXV, 1908, pp. 244, 338; XXVI, p. 95.

³ The British Warblers: A History with Problems of their Lives. By H. Elliot Howard, F. Z. S., M. B. O. U. Illustrated by Henrik Grönvold, London: R. H. Porter, 7 Princess Street, Cavendish Square, W. Part 3, February, 1909. Price, 21s. net.

Blackcap, pp. 1–30, 1 colored plate of male and female, 8 photogravure plates of male in various attitudes; Pallas's Warbler, 2 pp., 1 col. pl.; Radde's Bush-Warbler, 2 pp., 1 col. pl.; Chiff-chaff, 1 photogr. pl. of female; 4 maps, showing summer and winter distribution of the Blackcap and Garden Warbler.

(Auk, XXV, 1908, pp. 339, 340). The greater part of the present issue is devoted to the Blackcap (*Sylvia atricapilla*), to which are devoted 36 pages of the text, a colored plate of male and female, 8 full-page photogravures, depicting the male in various attitudes, and maps showing its summer and winter distribution. A colored plate and two pages of text are given respectively to Pallas's Warbler and Radde's Bush-Warbler, for each of which there is apparently only a single British record. There is also a photogravure of the female of the Chiff-chaff, and two maps showing the summer and winter distribution of the Garden Warbler. The method of treatment and the general character of the work have already been described in our notice of Parts I and II, to which the character of the present part strictly conforms.

The opening paragraph of the 'Life History' of the Blackcap states: "There are many facts in the life of this bird which are good examples of the contradictory nature of the evidence a naturalist often has to face, and this makes the character of the species an unusually interesting one." And we find some thirty pages are given to an elucidation of its traits during its summer sojourn in the British Islands — from the first arrival of the males in spring till the departure of the species in autumn. Special attention is given to the activities of the male, so noteworthy for its powers of song, its energy, excitability, and "bodily and vocal antics." In discussing the part played by the vocal powers of the male in courtship, he again (see Parts I and II) reverts to the theory of sexual selection, for which his observations fail to give convincing support. He says: "Until the females arrive the males usually sing their true song, but occasionally, especially when excited, imitate other species. Upon the arrival of the females a change takes place, and excitement is at its highest point, with the result that the true song is so far forgotten that, especially during that part of the courtship when the male is close to the female, high-pitched squealing notes, together with imitations, are almost solely produced, and often for a considerable time without a pause. Now let us see how the males behave under the influence of a different kind of excitement. Remove a young one from the nest, when old enough to recognize and reply to its parents, and notice the effect produced. The male approaches within a few yards of you, twists and turns on the branches, or flutters and flaps along the ground, uttering short snatches of its song identically the same as when courting, but more often squealing and imitating other species. Here, then, we have a species which performs, not only during the period of courtship, but also at other periods of excitement in its life, a remarkable series of both bodily and, if I may use the term, vocal antics. We cannot disregard these facts. If the song has really been developed owing to the females showing a greater preference for the males with the more highly developed vocal powers, is it not a little curious that, during the courtship, the true song should be so far forgotten that the males, in their great excitement, indulge in a medley of imitations of the songs and call-notes of alien species?

"The fact that birds with gorgeous plumage do not as a rule possess any great powers of song, and, on the other hand, that the best singers are as a rule dull-colored, is regarded as an indication of the reality of sexual selection, in so far as it proves that the excitement of the female has been essentially affected by only one of the characters of the male. If this were a true interpretation of the facts, which are not disputed, we should, by the same train of reasoning, expect to find that the bodily and vocal antics have been mutually exclusive, that the best singers do not, during their courtships perform in a manner which could be interpreted as a display of plumage. But we do not do so. The best singers *do* perform in the most extravagant manner possible, and this seems to me to lessen the importance that is to be attached to the mutual exclusiveness of gorgeous coloring and beautiful song.

"The view that I hold with regard to these extravagant bodily antics is that they are reflex actions directly resulting from any excessive excitement, that they are not confined solely to courtship, and do not in any way influence the female. This view, I am inclined to believe, gains considerable support from the fact that we find a parallel case in the vocal organs, namely, that whenever the excitement reaches a certain degree of intensity, no matter how different the stimulus may be, the reactions that follow are always similar."

On a preceding page he states that it is difficult to believe that any species can perform a greater variety of extravagant antics, bordering at times on the ludicrous, than those of the Blackcap under periods of excitement. The antics of the Great Bustard, Birds of Paradise, Argus Pheasants, etc., are very wonderful, and well known on account of the large size or conspicuous coloring of the birds; in the case of the Blackcap and other small common species the conditions are reversed, the birds being small and inconspicuously colored, and close attention to their habits is necessary to realize what is really taking place.

Mr. Howard, with his analytical temperament and psychological attitude, also ventures to call in question the affection or devotion it is customary to recognize in birds. On this point he says: "I am doubtful whether such an emotion as affection, using the term in the sense applied to human personality, influences their actions to any degree, or, indeed, even exists. There are many birds that pair for life, and there are some apparently pine for a lost mate, and these facts seem to show something more than mere passion, but, on the other hand, the negative evidence — that of the callous behavior of the males, except during the period of sexual passion, of the desertion of the female by the male directly the young are able to take care of themselves, of polygamy, and of the replacement of a lost mate again and again in an incredibly short space of time — is so strong that it precludes the possibility of the existence in at least a large majority of the cases, of any feeling beyond a momentary passion."

These excerpts show the broad scope of the writer's subtitle, 'A History of their Lives,' while a perusal of his 'Life Histories' of the various species

treated will show how intimate is his knowledge of the ways of the birds whose attitudes under various degrees and kinds of excitement his photographure plates so well depict.—J. A. A.

Grinnell's 'A Bibliography of California Ornithology.'—In his 'A Bibliography of California Ornithology,' Mr. Grinnell¹ has contributed a work of very great convenience and value, for which he is entitled to the gratitude of every ornithologist who is seriously interested in North American ornithology. The labor of compiling, from original sources, the 1785 titles this work is stated to contain can be duly appreciated only by those who have attempted to prepare a complete bibliography of any large group of animals of any considerable geographical area. The work of collecting these titles, the author tells us, was begun in 1900, and has been continued at intervals to date. The list of titles here published covers the period from 1797 to the end of the year 1907, hence eleven years more than a full century. The author states that "every title, except two or three," has been copied by him personally, and "with constant regard to preserving precise wording, spelling and punctuation." The titles are annotated where insufficient to indicate the extent or nature of the information covered by them, particularly as regards the locality, and the species included, if new or constitute important records. In case the names used are not now current, their modern equivalents are indicated. In a word, the work is compiled on the lines of the best modern models, and apparently with a completeness that leaves little to be desired. It is not to be presumed, nor is it assumed by the author, that every title that should be included has been found, since it is a recognized impossibility to attain perfection in a work of this nature. It is properly rounded out by a series of indexes—to authors, to local lists by localities, to the serial publications cited, and to the bird names mentioned, both vernacular and systematic. It is safe to say that this is the most important contribution to the bibliography of North American ornithology since the Couesian contributions of 1878–1880 set the high standard here closely followed.—J. A. A.

Mearns on Philippine Birds.—Two recent papers by Dr. Mearns deal principally with the birds of the Philippine Islands, the first relating exclusively to them, while the other records species collected by Dr. Paul Bartsch in Borneo, Guam, and Midway Island. The first² includes three

¹Cooper Ornithological Club | of California | Pacific Coast Avifauna | No. 5 | A Bibliography of California Ornithology | By | Joseph Grinnell | A Contribution from the Museum of Vertebrate Zoology | of the University of California | [seal] Santa Clara, California | Published by the Club | May 15, 1909 — Large 8vo, pp. 1–166, Price, \$1.50.

²Additions to the List of Philippine Birds, with Descriptions of new and rare Species. By Edgar Alexander Mearns, Associate in Biology, U. S. National Museum. Proc. U. S. Nat. Mus., Vol. XXXVI, No. 1679, pp. 435–447. Published May 22, 1909.

additions — *Sterna longipennis*, *Lobipes lobatus*, *Tanygnathus megalorhynchos* — collected by the author in 1906, and describes five new species and nine new subspecies, also all but three collected by the author during his explorations in the military service in 1904–1907.

The second paper is a report on Dr. Bartsch's collections¹ made chiefly in the Philippine Islands, but which include 7 species taken at Sandakan, Borneo, 5 taken at Guam Island, and 10 taken at Midway Island. The Philippine list includes 122 species and subspecies, two of the latter being described as new, all collected by Dr. Bartsch in 1908. The collection is said to fill many important gaps in the National Museum series of Philippine birds. — J. A. A.

Brooks on Birds Found in West Virginia.² — According to a note of explanation signed by the author, this 'Report' is a descriptive catalogue of a collection of mounted birds placed in the rooms of the State Board of Agriculture of West Virginia in November, 1908, and is not an attempt to give a complete list of the birds of the State, as the cover title of the 'Report' might seem to imply. This collection contains 331 specimens, representing 193 species, while the total list of West Virginia birds known to the author is 250. The caption of the list is: 'A Descriptive Catalogue of the Birds in the Ornithological Exhibit of the West Virginia Board of Agriculture.' It describes the character, as to age, sex and season, of the birds exhibited, with a brief statement of the range of the species, and of the manner of their occurrence in West Virginia, often with definite records of capture in the case of rare species; also a brief statement of the breeding range, nesting habits and food. While thus prepared with a view to local use, it contains matter of faunistic value. Four excellent colored plates illustrate the Rose-breasted Grosbeak, Blue Jay, Baltimore Oriole, and Purple Finch, all from the National Association of Audubon Societies' series of 'Educational Leaflets,' originally appearing in Vol. IX, 1908, of 'Bird-Lore,' though we here find no reference to the fact of their previous publication. — J. A. A.

Dearborn on Birds from British East Africa.³ — This is an annotated list of the birds collected by Mrs. C. E. Akeley, on the last expedition of the Field Museum of Chicago to East Africa during the years 1905–07, under the direction of Mr. C. E. Akeley. An accompanying map indicates the

¹ A List of the Birds collected by Dr. Paul Bartsch in the Philippine Islands, Borneo, Guam, and Midway Island, with Descriptions of three new Forms. By Edgar Alexander Mearns, Associate in Biology, U. S. National Museum. Proc. U. S. Nat. Mus., Vol. XXXVI, No. 1683, pp. 463–468. Published May 27, 1909.

² No. 12. Report of the West Virginia State Board of Agriculture, for the Quarter ending December 31, 1908. [Subtitle:] List of Birds Found in West Virginia. Charleston, W. Va., 1909. — 8vo, pp. 1–65, and 4 col. pl.

³ Catalogue of a Collection of Birds from British East Africa. By Ned Dearborn, Assistant Curator of Ornithology. Field Museum of Natural History, Publication 135 = Orn. Series, Vol. I, No. 4, pp. 141–190. May, 1909.

localities at which collections were made, and a bibliography of the principal papers relating to the ornithology of the region precedes the list, which numbers 228 species, one of which is described as new. In addition to the dates and localities of the specimens, brief field notes are sometimes given, and also remarks on seasonal phases of plumage. Also in addition to the citation of the type locality and the original description of the species, references are often made to papers wherein the character and relationships of the species have been discussed by previous authors.—J. A. A.

Dawson and Bowles's 'The Birds of Washington.'—The large paper edition of this great work¹ is a magnificent example of modern book-making, the illustrations and typography being almost beyond criticism. The text is an up-to-date résumé of present knowledge of the birds of the State of Washington, an area of large extent and exceedingly diversified. It is, furthermore, the first attempt to deal with the birds of any portion of this continent in a *de luxe* style of such magnitude.

The treatment of the birds, the author tells us, is from the standpoint of the Washingtonian. The characteristic birds of the State are thus considered at length, says the author, "merely because they are ours and have to be reckoned with; while others, more interesting, perhaps, have not been considered at length simply because we are not responsible for them as characteristic birds of Washington." In brief, it may be said that 'The Birds of Washington' is constructed textually after the model of the author's previous 'The Birds of Ohio' (1903),—a very good model, by the way, and the present work, like its predecessor, may be characterized as a scientifically trustworthy popular manual of the birds of the region to which it relates, with a wealth of well-chosen illustrations, the full-page plates being especially noteworthy for their excellence and appropriateness. The 16 colored plates, from water color drawings by Allan Brooks, are especially pleasing, as are also the photogravure plates and a number of text illustrations from the same artist's drawings. Reproductions of photographs of birds, their nests and eggs, and their characteristic haunts, figure largely, as would be expected, in the several hundred text illustrations.

¹ The Birds of Washington | A Complete Scientific and | Popular Account of the 372 species of Birds | found in the State | By | William Leon Dawson, A. M., B. D., of Seattle | author of "The Birds of Ohio" | assisted by | John Hooper Bowles, of Tacoma | Illustrated by more than 300 original half-tones of birds in life, nests, | eggs, and favorite haunts, from photographs by the | author and others | Together with 40 drawings in the text and a series of | full-page color-plates | by | Allan Brooks | — | Large paper edition | with photogravures and special photographs | Sold only by subscription | Volume I [-II] | — Seattle | The Occidental Publishing Co. | 1909 | All rights reserved | — 2 vols. 4to. Vol. I, pp. xvi + 458, 8 col. pll., 3 photogravure pll., 3 photographs (inserts), 7 half-tone pll., and numerous half-tone text figures. Vol. II, pp. lli + 459-997, 8 col. pll., 3 photogravure pll., 3 photographs (inserts), 9 half-tone pll., and numerous half-tone text figures.

According to a statement on a fly-leaf preceding the title-page, the whole edition consists of 1250 copies, of which 200 numbered and signed copies form a special "Large Paper Edition."

While the work has been prepared and largely written by Mr. Dawson, he explains at length the authorship relation with Mr. Bowles, who had already in hand a work on the birds of Washington before Mr. Dawson appeared upon the scene, he crediting Mr. Bowles "with unbounded generosity" in placing the results of his labors at his disposal and in continuing his aid in the gathering of material for the work. Except in the case of articles signed with Mr. Bowles's name, "and in most of the unsigned articles on Grouse and Ducks, where our work has been a strict collaboration," says Mr. Dawson, "the actual writing of the book has fallen to my lot." The 'Analytical Keys,' at the end of Volume II (pp. 939-960), are accredited to Prof. Lynds Jones.

The nomenclature is that of the A. O. U. Check-List as revised down to and including the Fourteenth Supplement, but the arrangement is that of the Check-List reversed, with some further modifications, as explained in the preface. Volume I thus begins with the Oscines, with the Corvidæ as the leading family. As indicated on the title-page, the number of forms admitted as birds of Washington is 372. A 'British Columbia Supplement' (pp. 963-984), with annotations by Allan Brooks, gives (A) a list of the species included in 'The Birds of Washington' that have not as yet been reported from British Columbia; (B) "descriptions of species known to occur in British Columbia but presumed not to occur in Washington" (14 species), or (C) "whose occurrence in Washington is presumptive" (25 species); and (D) "Washington Hypothetical List," or "species not known to occur in British Columbia but likely to occur or have occurred in Washington" (22 species).

A 'publisher's note,' near the close of the work states that the 'Bibliographies' referred to in the preface as to be found in the 'Appendices' are omitted on account of 'The Birds of Washington' having already considerably exceeded the limits originally assigned to it. In fact, our chief criticism is in respect to the size and ponderosity of the work, which must interfere with its convenient use as a manual; but a work with such a profusion of illustrations, requiring the use of heavy paper, and making a thousand pages, could hardly be otherwise than ponderous, especially the large paper *de luxe* edition, like the sample now before us. It is, however, undeniably a handsome work, creditable alike to the author and his various collaborators, to the publishers, and to the State whose birds are here so effectively depicted.—J. A. A.

Shufeldt's 'Osteology of Birds.'—Although this work is entitled 'Osteology of Birds,'¹ it is restricted to the 'Accipitres,' 'Gallinæ,' 'Anseres,' and the Cuckoos; and of these the forms treated in detail are mainly North American. It is divided into four sections, as follows: (1) 'Osteology of the Accipitres,' pp. 1-168, text figures 1-65, plates 1-16; (2) 'Osteology of the Gallinæ,' pp. 169-248, text figures 1-36, plates 1-8; (3) 'Osteology and

¹ Osteology of Birds. By R. W. Shufeldt, M. D. New York State Museum, Museum Bulletin 130. May 15, 1909. 8vo, pp. 1-381, with 145 text figures, and 26 half-tone plates.

Classification of the Anseres,' pp. 249-344, text figures 1-42, plates 1, 2; (4) 'Osteology of *Coccytes glandarius*: A Comparative Study of New and Old World Coccyges,' pp. 345-357, text figures, 1, 2. This is followed by a Bibliography of the author's writings that bear directly upon the Anatomy and Classification of Birds' (pp. 357-367), and the Index (pp. 369-381).

From the author's preface (dated "Washington, D. C., January 31, 1901") this work appears to be based on his numerous previous papers on the osteology and classification of birds, which are presented in new form, "thoroughly revised, amplified and improved," with, for the most part, "new illustrations." The author's long series of contributions to avian osteology are thus brought together in convenient form, and represent his latest views on the relationships of the groups here treated. Its publication as a 'Bulletin' of the New York State Museum has already been explained by the author in another connection (Auk, XXVI, April, 1907, p. 217).—J. A. A.

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NOTES AND NEWS.

CHARLES K. WORTHEN, an Associate of the American Ornithologists' Union, died at his home in Warsaw, Illinois, during the last week in May,¹ 1909, in the 59th year of his age, he having been born in Warsaw, September 6, 1850. His father, Amos H. Worthen, was for many years State Geologist of Illinois, residing at Springfield, where young Worthen was educated in the public schools. In 1867, he became associated with his father as draughtsman, and the ten years following this date he was engaged in illustrating the reports of the Illinois Geological Survey, and was also employed in a similar capacity on the reports of the Wheeler Surveys West of the One Hundredth Meridian. One winter was spent at the Agassiz Museum in Cambridge, Massachusetts, making drawings of the teeth of fossil sharks under the direction of Mr. Orestes H. St. John. Naturally, under such associations, he became strongly interested in natural history, but appears to have never seriously entered upon research work, and has hence published very little. His knowledge of the subject, however, was considerable, and his tastes led him to engage in the collection and sale of natural history specimens, in this way becoming well known to the naturalists of the country, and especially to museum curators, who found him always intelligent and trustworthy. For a number of years he was a member of the school board of Warsaw, and at the time of his death was one of the directors of the public library. Personally he was genial and companionable, of an optimistic temperament, and widely respected by his fellowtownsmen. He was married in 1873, and is survived by his widow, a son and two daughters. The press of Warsaw has paid high tribute to his memory as a valued citizen.

THE June issue of 'British Birds' (Volume III, No. 1) propounds a 'British Birds' scheme for marking ('tagging' birds, as an aid in acquiring definite information regarding the movements of individual birds, and thus obtaining light on some of the imperfectly understood features of bird migration. In an editorial on the subject, reference is made to results thus achieved in Denmark and Germany, and instructions are given in reference to the marking of birds and reporting their subsequent capture. In short, a system is proposed very much like that in vogue in this country (see Auk, XXVI, April, 1909, pp. 137-143), although no reference is here made to the American records or methods. Mr. H. F. Witherby, the editor of 'British Birds,' has prepared the following circular on the subject, for which we gladly give space in the present connection.

"A short while ago a Stork was shot in Rhodesia bearing upon its leg a metal ring, which proved that the bird had been marked in Prussia, when it was a nestling, by the Rossitten Bird Observatory, while more recently a Stork similarly 'ringed' in Hungary was shot in the Kalahari Desert.

¹ Exact date not yet received; the funeral was on May 29.

"Mr. H. F. Witherby, the Editor of *BRITISH BIRDS*, is inaugurating in connection with his Magazine a scheme for marking birds in a similar way in this country. It is hoped by this means to gain a more exact idea of the movements of individual birds than has ever been possible by any other method, and this should not only throw light upon the more general aspects of migration, but it should tell us a great deal that is at present obscure with regard to particular points. For example, while we may know the general distribution of a species in winter and summer, we do not know the extent of the migration of individual birds; or, indeed, whether in such cases as the Song-Thrush and Robin, certain individuals migrate at all. The movement of sea-birds are very little understood, and much might be learned from marking a large number. This plan might also tell us what influence age has upon plumage, etc.; where a young bird, whose birth-place is known, breeds; whether individuals return to previous nesting haunts, and whether pairs come together again in successive breeding seasons.

A number of the readers of *BRITISH BIRDS* are taking the matter up, and it is expected that a large number of birds of all kinds will be ringed this summer. The rings are extremely light and do not in any way interfere with the bird's power of flight, each is stamped "Witherby, High Holborn, London," and bears a distinctive number, which in the smaller sizes is stamped inside the ring, and it is hoped that anyone into whose hand should fall a bird so marked will send the bird and the ring, or, if this is not possible, then the particulars of the number on the ring, the species of bird, and the locality and date of capture to the address given."

Of special interest to ornithologists, as well as to students of biogeography in general, is Dr. Philip P. Calvert's map of the distribution of mean annual temperatures in Mexico and Central America, recently published in the Proceedings of the Academy of Natural Sciences of Philadelphia (Vol. LX, 1908, pl. xxvi). The map is colored to indicate five temperature zones, ranging from 10° to 30° C. (50° to 86° F.), each zone covering thus a range of 9° F., and distinguished by a different color. It is shown that a given mean annual temperature reaches a much higher latitude and a higher elevation on the Pacific coast than on the Atlantic; and that the mean annual temperature of the plateau region of Mexico (59°-68° F.) extends continuously but in narrowing width to about latitude 18° in southern Mexico, and thence in small and distantly separated areas to Nicaragua and Costa Rica.

A NEW natural history journal, entitled, 'The Midland Naturalist devoted to Natural History and primarily that of the Prairie States,' has made its appearance, the first number bearing date April, 1909. It is an octavo, and the first number, consisting of 28 pages and 3 plates, is mainly botanical. It contains, however, the beginning of a nominal 'Tentative List of the Birds of St. Joseph Co. Ind. and Vicinity,' which

indicates on the part of the author a considerable degree of conservatism in matters nomenclatural, or lack of familiarity with any standard authority later than the first edition of the A. O. U. Check-List. The magazine is published at Notre Dame, Indiana, under the editorship of J. A. Niewland, C. S. C., Ph. D., who is also apparently the publisher. (Price, \$1 a year, single numbers 20 cents.) The plea for the existence of this new aspirant for journalistic honors is the alleged want felt by the editor "for some ready means of publication" for students of the biota of the 'Midland States.'

A NEW French periodical devoted to ornithology is the 'Revue Française d'Ornithologie Scientifique et Pratique,' the first number of which bears date 7 Mai, 1909. It is in royal octavo, the first number comprising 16 pages. It is to be devoted not only to birds, but to everything relating to birds. It is published by Louis Denise, 14 Rue Antoine-Roucher, Paris; price, 7 francs per year, 60 centimes per number. The acting editor is M. A. Menegaux, and it has the promise of support from other well-known French authorities.

THE Bureau of Science of the Government of the Philippine Islands has announced 'A Manual of Philippine Birds,' by Richard C. McGregor, to be published in two parts of about 350 pages each, the first part being already in press. It will give descriptions of all the species of birds known to inhabit these islands, with much hitherto unpublished matter relating to their nests and eggs and habits. It is intended to meet the needs of bird-students, both professional and amateur, and will contain keys to the species, genera, and higher groups, as well as diagnoses. The work may be ordered in this country of the Macmillan Company, New York; price of the complete work, \$4.

INDEXES to periodical literature are so useful that it is a pleasure to call attention to the index to the first ten volumes of 'The Condor,' prepared by Mr. H. B. Kaeding and just published as No. 6 of the 'Pacific Coast Avifauna'. 'The Condor, as is well known, is the 'Bulletin of the Cooper Ornithological Club', the first volume of which carried this title only. The present index is prepared on much the same lines as the twenty-year index to 'The Auk', compiled under the direction of Dr. Dwight, except that there is no attempt to discriminate the different kinds of information under the citations of species.

THE Provincial Museum of Natural History and Ethnology, Victoria, British Columbia, has recently issued an illustrated guide to the collections of Mammals, Birds, Reptiles and Fishes, prepared by the Curator, Mr. Francis Kermode. It is profusely illustrated with half-tone plates of groups of mammals and birds and other exhibits in the Museum, and forms a large octavo brochure of nearly 100 pages, of which pages 21-74

are devoted to the birds. The text consists of annotated lists of the Vertebrates of British Columbia, so far as they are represented by specimens in the Victoria Museum. The birds of British Columbia are apparently quite fully shown, and the annotated list of the species gives briefly the manner of their occurrence in the Province, with often a short account of their habits. It is thus not only a Visitors' Guide to the collections but a source of information respecting the vertebrate fauna of the Province. As said by the Curator: "The Provincial Museum (being essentially a British Columbia Museum) necessarily contains only those specimens obtained within its borders, hence none of them were procured by exchange with other parts of the Continent, so that the value of a collection so truly local in its formation is incalculable."

THE June number of the 'Bulletin' of the New York Zoölogical Society is designated as the 'Wild-Life Preservation Number,' and is devoted to a summary of recent efforts for game protection and an attempt to promote further interest in this too long deferred awakening to the wholesale depletion of 'wild life.' This number of the 'Bulletin' contains a paper by the President of the Society, Professor Henry Fairfield Osborn, on 'The Zoölogical Society's Work for Wild Life,' and another by Madison Grant, the Secretary of the Society, on 'The Future of Our Fauna,' but most of the twenty pages that make up the number are by the Director, William T. Hornaday. Readers of 'The Auk' who recall Mr. Hornaday's paper on 'The Destruction of our Birds and Mammals: a Report on the Results of an Inquiry,' published in 1898 (Second Ann. Rep. New York Zoöl. Soc., for 1897, pp. 80-126), will not be surprised at meeting with exaggeration in the present connection, but will hardly be prepared for statements to the effect that scientific societies, scientific institutions, and scientific men have, with one or two mentioned exceptions, done little or nothing for the protection of birds and game; or to hear that: "Even down to 1896, the scientific ornithologists of America, as a body, had done *absolutely nothing* in the cause of bird protection." (Italics as in the original.)

As is well known, at the second meeting of the American Ornithologists' Union, held in 1884, the protection of birds was considered at length by the leading members, with the result that a 'Committee on Bird Protection' was appointed, and its report at each annual meeting of the Union in subsequent years was always a prominent feature of its sessions. Furthermore, as early as 1886, this Committee published the first 'broadside' in behalf of bird protection, under the title: 'American Ornithologists Union. Bulletin No. 1 of the Committee on Bird Protection. Destruction of our Native Birds.' It appeared originally as a supplement (16 pages, 4to) in 'Science' (for February 26, 1886), and was reprinted as a separate in large editions and widely distributed gratuitously. A few months later appeared 'Bulletin No. 2 of the [A. O. U.] Committee on Bird Protection,' dealing with 'Protection of Birds by Legislation.' This was originally printed in 'Forest and Stream' for November 11, 1886, and reissued in a large edition

(8 pages, 4to.) for gratuitous distribution. In this 'Bulletin' the then existing New York law for the 'Preservation of Song and Wild Birds' was analysed and criticised, and a 'revised draft' presented as a substitute. The Committee's draft later became, in substance, not only the law for the protection of birds in the State of New York, but has now been adopted by nearly every State and Territory in the United States, and is everywhere known as the 'A. O. U. Model Law.'

The A. O. U. Committee on Bird Protection is also the parent of the now widespread Audubon movement which was originally started in 1886 by members of the American Ornithologists' Union. The reports of the A. O. U. Committee and of the National Association of Audubon Societies were published in 'The Auk,' the official organ of the Union, until five years ago, the last report forming a document of 112 pages with numerous half-tone illustrations. Further comment on what "the scientific ornithologists of America, as a body," have "not" done is unnecessary, although it may be added that the present directorate and the principal officers of the National Association of Audubon Societies are all members, and nearly all of them Fellows, of the American Ornithologists' Union.